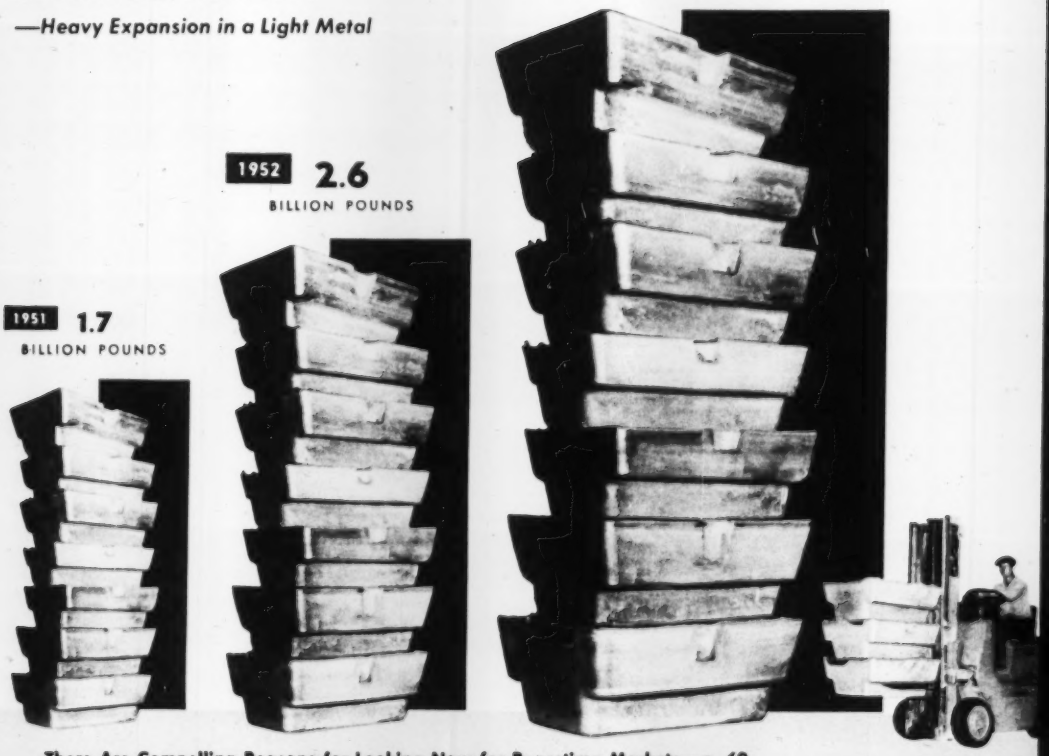
FEBRUARY 4, 1952

STEEL

THE WEEKLY MAGAZINE OF METALWORKING

ALUMINUM CAPACITY

—Heavy Expansion in a Light Metal



There Are Compelling Reasons for Looking Now for Peacetime Markets—p. 69

FINISHING WITH FELT
—You Can Polish, Buff and Grind, p. 88

BUILT-IN EFFICIENCY
—New Welder Plant Has It, p. 92

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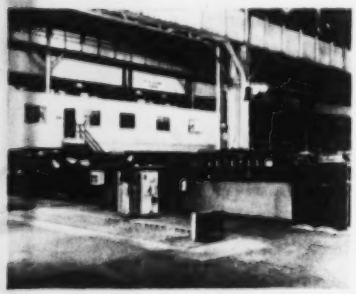
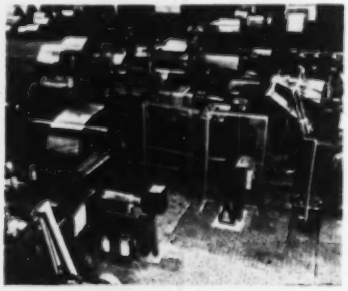
84" SHEAR LINE

The Aetna-Standard 84" Shear Line for cold-reduced product at the Gary Sheet and Tin Mill, plant of U. S. Steel Company, features several innovations. In this view, from the entry end, you can see the mandrel type pay-off reel for 72,000 lb. coils; a special loading ramp to prevent coil damage; pinch roll unit; looping pits; 16" heavy duty side trimmer and Hallden Flying Shear.





The delivery end features a magnetic prime piler. The Side Trimming and Shearing Line features a Scrap Baller forming a ball 36" O.D. x 60" wide. The line speed is 90' to 450' per minute, processing sheets from 30" to 200" in length, widths from 18" to 74".

ASSOCIATED COMPANIES

THE AETNA-STANDARD ENGINEERING COMPANY • PITTSBURGH, PA.

Pennsyl

Plenty of
holding power
BETHLEHEM
STEEL
Bethlehem supplies every type of Fastener

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If any of these advantages suggest economies in your operations write us for full details—no obligation, of course.

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Watervliet Arsenal
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Various Atomic Energy Plants and Laboratories

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A soldier's best friend in close quarters . . . is his bayonet. It must be tough enough to use as a pickaxe, hard enough to hold a fine edge. Ferro alloys from Tennessee are used to harden metals for bayonets and for the thousands of other metal items essential to the defense program.

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PRODUCTS & CHEMICAL
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STEEL
The Weekly Magazine of Metalworking

VOL. 130 NO. 5 FEBRUARY 4, 1952

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Editorial and Business Staff—Page 10. Advertising Index—Page 210. Editorial index available semiannually. STEEL also is indexed by Engineering Index Inc., 29 West 39th St., New York 18.

Next Week . . . **Production Heat Treating . . . Better Finishes Clean Aluminum Thoroughly . . . Special Tools for Aircraft Machining**

Published every Monday by the Penton Publishing Company, Penton Building, Cleveland 13, Ohio. Subscription in the United States and possessions, Canada, Mexico, Cuba, Central and South America, one year $10; two years $15; all other countries, one year $20. Single copies (current issues) 50 cents. Metalworking Yearbook issue $2.00. Entered as second class matter at the postoffice in Cleveland, under the Act of March 3, 1879. Copyright 1952 by Penton Publishing Co.

6 INSIDE REASONS

1 Helical, wear-hardened gears cut from alloy steel forgings and shaved before hardening for correct eccentricity and helical angle and bright, smooth surfaces—factors contributing to quiet operation and longer life.

2 Gear arrangement in simple train minimizes number of moving parts—promotes quietness.

3 Pinion and gear supported and spaced to reduce deflection—permits high load-carrying capacity.

4 Splash system with large oil reservoir assures constant and thorough lubrication of all parts.

5 Anti-friction bearing construction throughout.

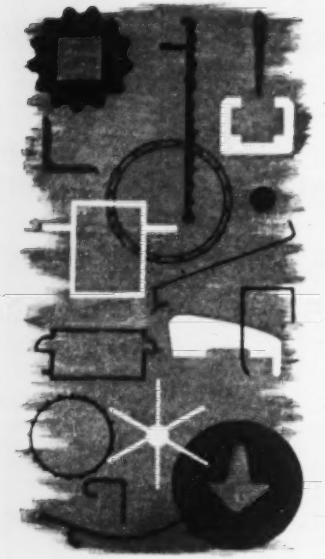
6 Reliance *Precision-Built* Motors provide the maximum in dependable and economical power.

RELIANCE Precision Built MOTORS

Write for GearMotoR Bulletin E-2404 covering A-c. and D-c. GearMotoRs to 60 Hp.

RELIANCE
ELECTRIC AND ENGINEERING CO.
1081 Ivanhoe Road • Cleveland 10, Ohio
Sales Representatives in Principal Cities

"All Motors are NOT Alike"



A profile of WERNER Aluminum Services

To the prime contractor who needs help *now*, Werner's extensive manufacturing and production facilities invite careful investigation as your dependable production source.

Two strategically located Werner high-capacity plants are currently servicing nationally known prime contractors*.

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Aluminum • Stainless Steel
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* Names on request

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Behind the Scenes...

Decade of Change

Ten years ago this week, The Business Trend, then as now one of the most popular features in the book, showed STEEL's industrial production index at about 135, auto output at around 80,000 units a week, electric power distribution at 3.4 billion kilowatt hours a week and freight car loadings at 811,000 weekly.

This week's Business Trend, which begins on p. 77, shows economic activity far higher in every category but freight car loadings. STEEL's index is now over 200, auto output is more than 90,000. Power distribution is 7.7 billion kilowatt hours, but freight car loadings are 750,000.

Over the past ten years, several different editors have supervised the department, and currently Assistant Editor Sam Baker is the proprietor. Every week he carries between 25 and 30 sets of business barometers in his pages to help you learn what related businesses are doing, plan your business future and plot your economic position. In addition are about 1000 words of text to point out the unusual economic indicators and to spot some of the general trends that will affect your future activities.

Lone Star

We are beginning to believe the propaganda that in Texas things are done on a grander scale than anywhere else. We've just received a copy of the 1952-53 *Texas Almanac*.

In some 672 pages are jammed 700,000 words giving more facts about the state than we dreamed existed. The state has a population of 7.7 million, a land area of 263,644 square miles and a water area of 3695 square miles. The state boasts one county organized as recently as 1931. It's Loving County, probably so-named by some humorous Texan because only 227 people live in its 647 square miles.

Revamped

"Yours for the Asking." That's the new title for the Helpful Literature pages that this week begin on p. 177. Far more is new than the title. The range of the literature listed as available gratis has been widened to include reprints of editorial material that has appeared in STEEL, as well as bulletins and literature of other companies.

Type on the pages has been changed, the general treatment modified—all to make the section easier to read and more helpful to you.

In the past year the number of requests for literature offering hints on how to speed work, on making operations more efficient and on all the other related subjects in the section has increased 25 to 30 per cent.

Back to the Indians

You will be relieved to learn that Navajo and Hopi Indians will receive industrial training under the first American apprenticeship system in history.

As part of a ten-year, $88 million program, tribes in the Window Rock, Arizona area will be given the chance to learn any one of 28 skilled trades.

We related the above information to Geraldine, a cleaning woman in the building and our night editor. "What's so surprising about that?" she asked. "There's uranium around Window Rock."

Just Worms

Canned French fried worms, which have been exempted from price control, are described as being about 1½ inches long, very crisp, with a cheese flavor. Cheese-flavored or not, they're still worms.

Puzzle Corner

For our Jan. 21 furniture puzzle, Lewis D. Rice of Timken Roller Bearing Co. and M. S. Bailey of Machine Products Corp. were the first in with correct answers. The buyer could get 10 suites at $231, 10 at $273, 6 at $429, 4 at $600.60, 2 at $1001 and 1 at $1501.50.

Here's an old-time puzzle that's still good:

There are five caps in the room. Two white and three black. There are three men in the room sitting one behind the other facing a wall. Each man is wearing a cap, but none of them knows the color of the cap he is wearing. Which man can determine the color of the cap he is wearing and how?

Shrdlu

(Metalworking Outlook—Page 51)

odern day whippletree . . .

HARNESSING HORSEPOWER TODAY CALLS FOR HIGH STRENGTH SHARON* STEELS

Back before the automotive age it required a good, stout whippletree to transfer a single horsepower to the wheels of a carriage. Today we "harness up" 150 horsepower — transferring this energy through a single, slim drive shaft.

This requires good steel. Steel that will withstand a fibre stress of more than 38,000 psi, while spinning at speeds up to 5,000 rpm. Steel with a uniform flatness that will enable fabricators to easily produce a shaft of balanced wall thickness. Steel cold worked to a 95 maximum, with a minimum Rockwell of 80B, and a permissible elongation of but 7 per cent.

Sharon has long been a prime supplier of steels for drive shafts, because making precision steel in production quantities has, over the years, become a Sharon-steel habit.

*Specialists in STAINLESS, ALLOY, COLD ROLLED and COATED Strip Steels.

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Sharon, Pennsylvania

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For information on Titanium Developments contact Mallory-Sharon Titanium Corp., Niles, Ohio

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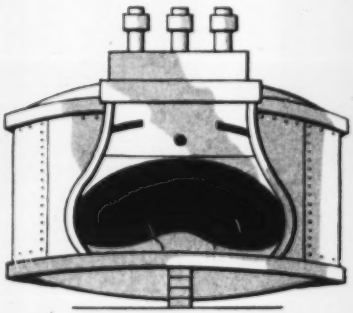
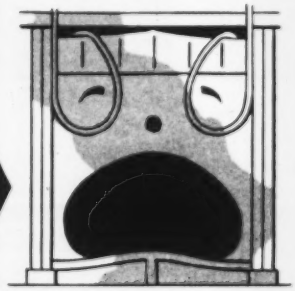
Help feed these hungry mouths!

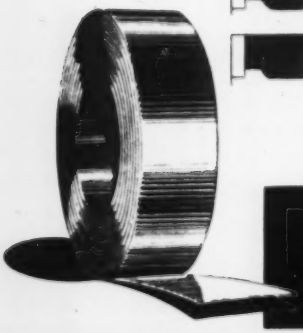




The steel industry NEEDS your scrap
to help supply YOUR needs in STEEL

ROOT OUT THE SCRAP TODAY

ROUTE IT ON ITS WAY!



Superior Steel
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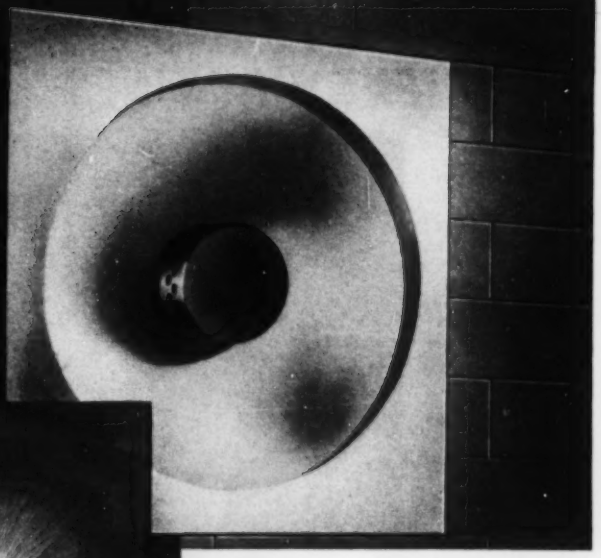
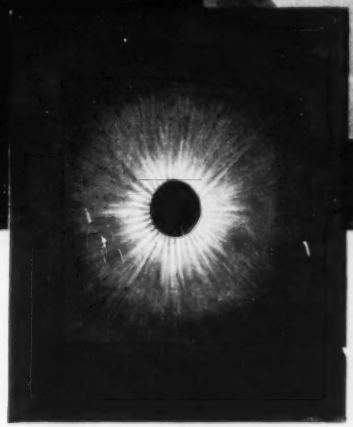
For precision heating with intense transfer of heat...



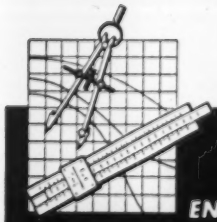


the **Bloom**

HTR

HIGH THERMAL RELEASE

BURNER



ENGINEERING CO., INC.

857 W. North Avenue Pittsburgh 33, Pa.

Recommended for use where quick heating and intense concentration of heat are desired, the Bloom High Thermal Release Burner will release up to 750,000 Btu per hour per cubic foot of combustion volume.

In this nozzle-mix burner, fuel (oil or gas) and combustion air are premixed within the alloy nozzle, forming a uniform, combustible mixture when discharged into the furnace. A turndown ratio of greater than 10 to 1 enables low input for holding purposes.

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Write for bulletin giving full details and description of the Bloom HTR Burner.

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PEORIA, ILLINOIS

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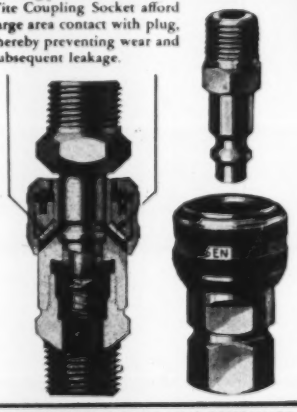

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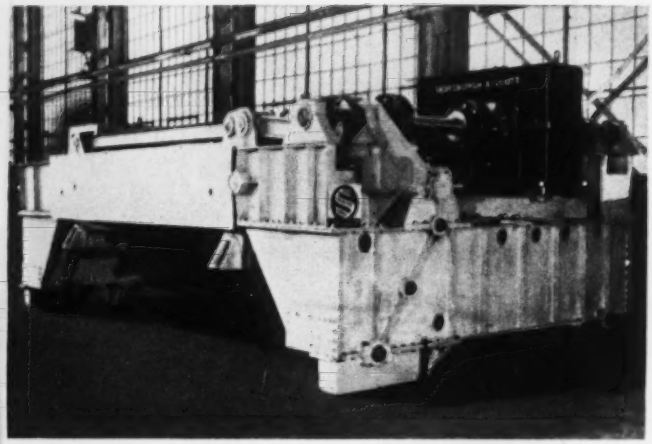


soaking pit cover through . . .

H & S REDUCERS

● The above photograph shows a soaking pit cover crane designed and built by Salem Engineering Company. Two Horsburgh & Scott Helical Speed Reducers are used on each crane...the lift drive handles a cover weighing about 28 tons and operates at a speed of 6' per minute... the traverse drive moves the crane at a speed of 88' per minute. Many of these cranes have been operating very satisfactorily for twelve to fifteen years... actual tribute to complete engineering design.

THE HORSBURGH & SCOTT CO.
GEARS AND SPEED REDUCERS
5112 HAMILTON AVE. • CLEVELAND 14, OHIO, U.S.A.

Send note on Company Letterhead for Speed Reducer Catalog 46

LETTERS
TO THE EDITORS

Look to Your Destiny

The ideas contained in Metalworking's Destiny (STEEL's Yearbook Issue, Jan. 7) have an unusual significance for the employees of our company. Can we buy 1000 copies?

A. J. John
Kearney & Trecker Corp.
Milwaukee

. . . one of the most constructive articles relating to the present world situation that we have had the privilege of reading.

A. Robert Thomson
president
Hosler Advertising Inc.
Peoria, Ill.

. . . found the article quite interesting and full of "food for thought". Please forward ten copies.

David V. Uihlein
Banner Mfg. Co.
Milwaukee

● *Copies for these and many other requests from readers have been forwarded.*

Who and Where Department

We would like the address of Eagle Engineering Co. to secure information on their soldering iron (Dec. 24, p. 82).

William S. Gale
McCord Corp.
Detroit

● *Address is: 1139 S. Wabash Ave., Chicago 5.*

Please advise how we may obtain the book "Incentive Management" by James F. Lincoln (Dec. 31, p. 24).

Gus Arvanitis
office manager
Peerless Tool Service Inc.
Toledo, O.

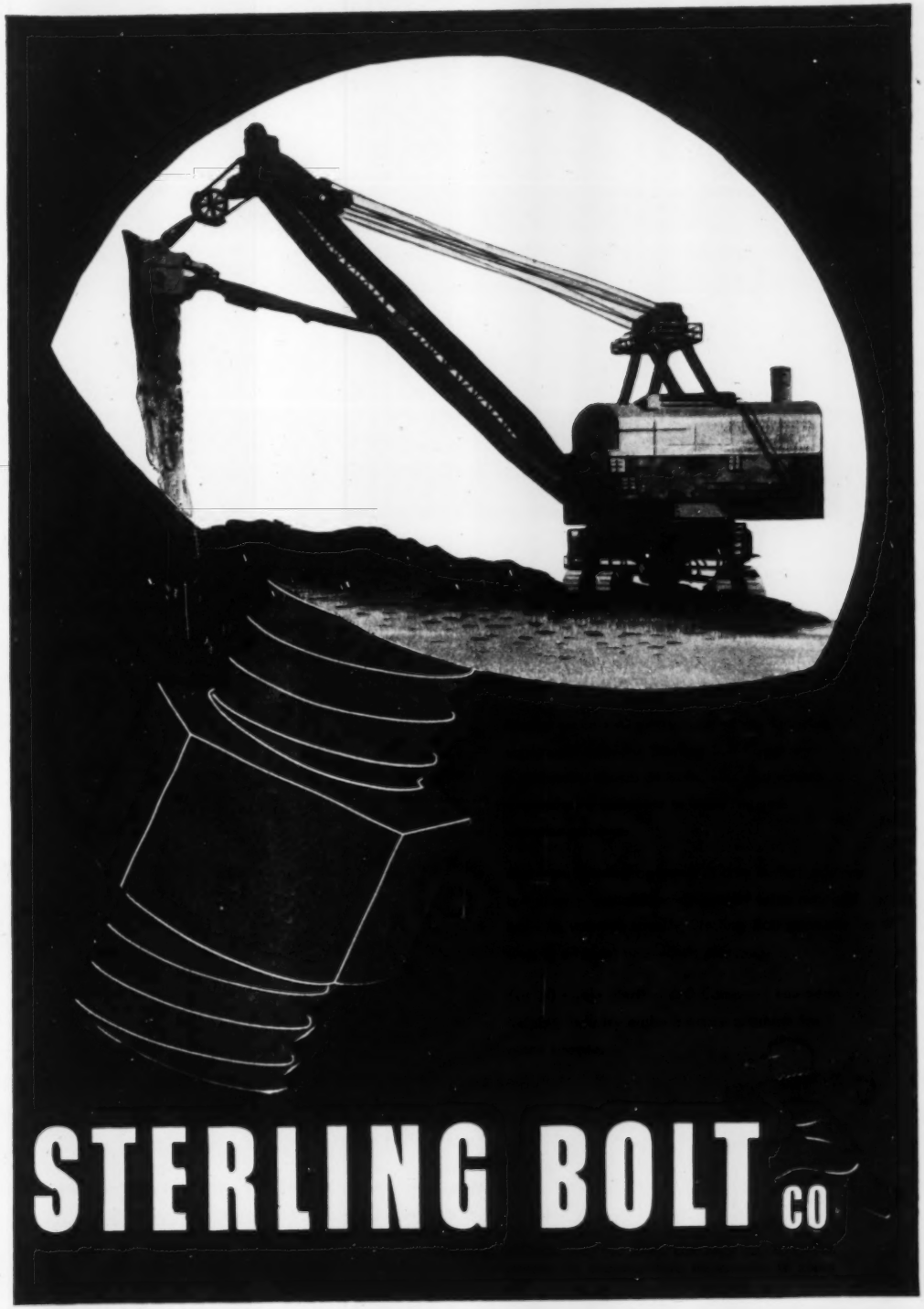
● *Write to Lincoln Electric Co., 22801 St. Clair Ave., Cleveland 17.*

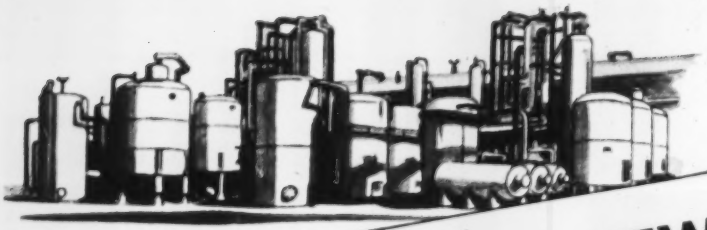
That's a Ton or Two

Reference is made to your article "More Blast Furnaces Planned" (Dec. 24, p. 25). You say to produce 120 million tons of ingots 133 million tons of pig iron and scrap will be needed—73.8 million tons of pig iron and 69.2 million tons of scrap. But, 73.8 million plus 69.2 million total 143 million, or ten million more than the 133 million you say is required.

A. W. Guda
purchasing department
Lukens Steel Co.
Coatesville, Pa.

● *The scrap figure should have been 59.2 million tons, not 69.2 million. Congratulations on careful reading.*


STERLING BOLT CO



Artist's sketch showing part of C.C. and C. C. C. Texas City plant.

EXTRA **Pitt Chem NEWS** EXTRA

VINYL COATINGS CUT MAINTENANCE COSTS 49%

HERE's actual case-history proof of the way vinyl coatings can cut surface maintenance costs in your plant. From 1946 to 1951, the Carbide and Carbon Chemicals Corporation protected their Texas City plant and equipment with tough, long-lasting vinyls instead of ordinary maintenance coatings. The result? Better, longer-lasting surface protection at little more than half the total cost!

Why not let us show you how Pitt Chem Vinyl Coatings can save you money and do a *better* job of protecting your plant and equipment against corrosion? These durable coatings provide excellent protection against a wide variety of corrosive liquids and fumes, including acids, salts, alkalis, petroleum products and alcohols. Just drop us a line outlining your problem and we'll provide you with the specific information or technical assistance you need.

PITT CHEM is Industry's Most Comprehensive Family of Protective Coatings

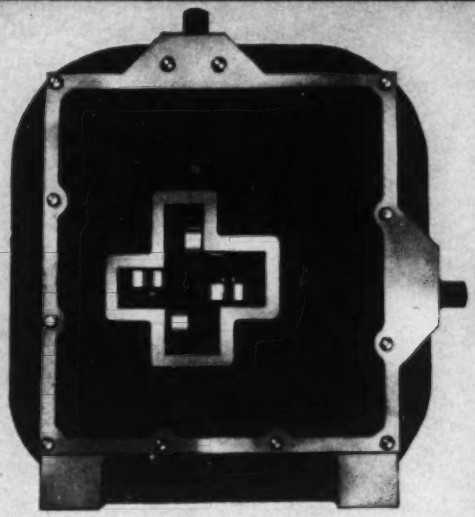
- ★ COAL TAR
- ★ ALKYD
- ★ CHLORINATED RUBBER
- ★ VINYL
- ★ PHENOLIC
- ★ EPOXY

★ OTHER SPECIALTY COATINGS

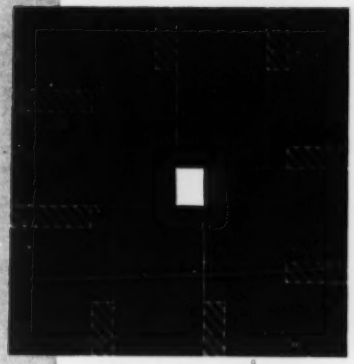
WAD 4082

PITTSBURGH COKE & CHEMICAL CO.

COAL CHEMICALS • AGRICULTURAL CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON



THE FENN TURKS HEAD offers many advantages over ordinary methods of shaping wire and rod. Featuring adjustable roll boxes, it *rolls* the material on both horizontal and vertical planes simultaneously. Available in friction drive or power drive.



UNIQUE FEATURE of Turks Head design is shown in this diagram of roll assembly. Four converging rolls form material to the desired shape. Square and rectangular shapes may be produced in varying dimensions by a simple roll adjustment.

Only Fenn Turks Heads bring you

MORE ACCURATE WIRE SHAPING AT LESS COST

A radical departure from the conventional draw-die, the Fenn Turks Head is characterized by the unusual operation and exceptional versatility of the die, in which the sides of the opening are four adjustable rolls. When the rod or wire is being formed into the more common square or rectangular shapes, the rolls may be adjusted to produce any width or thickness, in dimensions ranging from 0 to capacity.

EXCLUSIVE ADVANTAGES

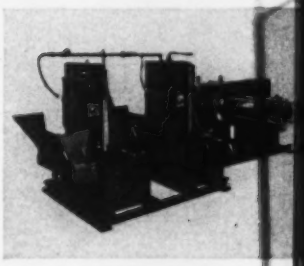
Increased Accuracy. When wire is shaped by ordinary rolling methods, the final rolling operation is apt to affect the dimensional accuracy secured by the edging process. By doing both these jobs at once — at the same point on the wire — Turks Heads eliminate this hazard. Also, since they roll *with* the work, Turks Head roll-surfaces are subjected to far less wear than rigid dies. This keeps wire sizes constant for a much longer period, to tolerances of ±.0005.

Greater Economy. Turks Heads eliminate the need for a costly inventory of stock as well as multiple dies, save the labor of frequent changing and redressing, and require less power than other methods.

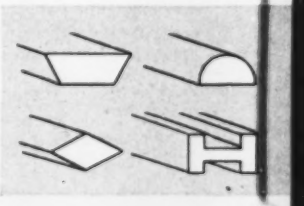
Faster. Besides their two-in-one operation, Turks Heads permit faster wire speeds.

GET THE DETAILS

on the many benefits Fenn Turks Heads can bring to your own wire-shaping operations. Contact your nearest Fenn Distributor, or write direct to THE FENN MANUFACTURING COMPANY, 1847 Broad St., Hartford 1, Conn.



FENN ROLLING MACHINES are built to take all sizes of Turks Heads, in double stand (as shown) or single stand.



ALL FROM THE SAME UNIT. Producing a wide variety of shapes from a single Turks Head is simply a matter of changing the specially ground rolls.

FENN MACHINES ARE SOLD BY:

ATLANTA
J. R. Watrous
BALTIMORE
Refer: Coico Mach'y Co., Phila.
BIRMINGHAM
Quinn & Quinn
BOSTON
Refer: Reynolds, Inc., Providence
BUFFALO
Syracuse Supply Co.
CHICAGO
Neff Kohlbusch & Bissell, Inc.
CINCINNATI
The Seifreat-Eisted Machinery Co.
CLEVELAND
Wm. K. Stamets Co.
COLUMBUS
The Seifreat-Eisted Machinery Co.
DALLAS
C. J. Harter, Machinery
DAYTON
The Seifreat-Eisted Machinery Co.
DETROIT
The Chas. A. Strellinger Co.
GRAND RAPIDS
Joseph Monahan
HOUSTON
C. J. Harter, Machinery
INDIANAPOLIS
State Machinery Co.
KANSAS CITY, MO.
Robt. R. Stephens Machinery Co.
LOS ANGELES
Hoffman & Hearst
MILWAUKEE
Neff Kohlbusch & Bissell, Inc.
MINNEAPOLIS
Northern Machinery & Supply Co.
NEW ORLEANS
Stauss & Haas, Inc.
NEWARK
A. C. Cook
NEW YORK
The Silvers Machinery Co.
NORFOLK
Tidewater Supply Co. Inc.
PHILADELPHIA
Coico Machinery Co.
PHOENIX
Hoffman & Hearst
PITTSBURGH
Wm. K. Stamets Co.
PROVIDENCE
Reynolds, Inc.
ROCHESTER
Syracuse Supply Co.
SAN FRANCISCO
C. F. Bulotti Machinery Co.
ST. LOUIS
Robt. R. Stephens Machinery Co.
SEATTLE
Star Machinery Co.
SYRACUSE
Syracuse Supply Co.
CANADA
MONTREAL, QUEBEC
TORONTO, WINDSOR
Williams & Wilson Ltd.
FOR EXPORT:
Indianapolis Machinery Export Co., Inc., New York, N. Y.

FENN

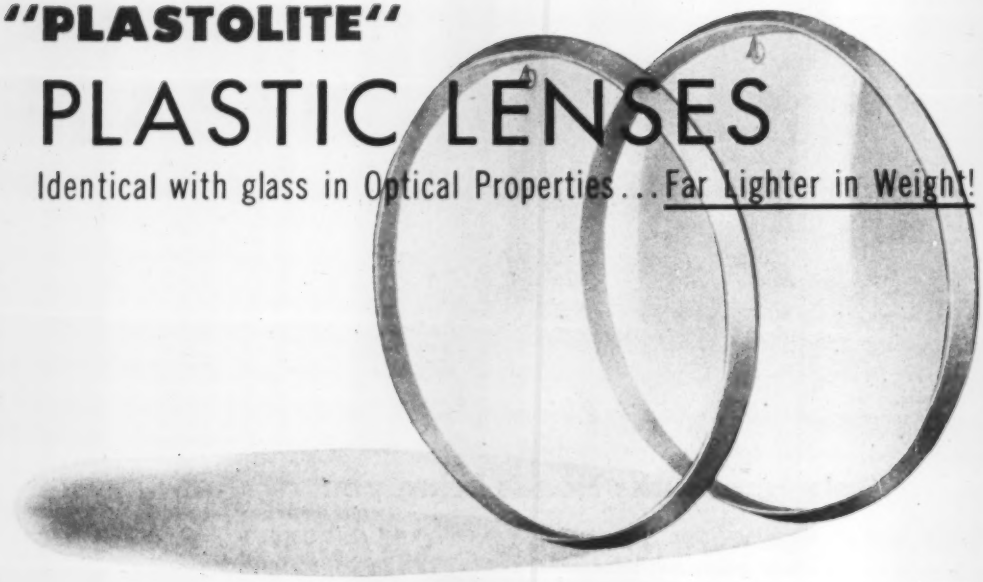
Forming metal for better and stronger products at lower cost

AO Announces

"PLASTOLITE"

PLASTIC LENSES

Identical with glass in Optical Properties... Far Lighter in Weight!



HERE IT IS...

the quality eye protection in plastic lenses many safety directors have wanted . . . the answer for workers who need protection but demand lightness heretofore unobtainable . . . the answer for companies who seek the enthusiastic cooperation of all exposed employees in cutting the high costs of eye accidents.

Made in the World's Cleanest Rooms!

Interested in plastic for years, AO has conducted constant research both in the protective properties of this material and in the atmosphere, facilities and controls required to assure maximum quality in the manufacturing process. In a new safety plant section at Brattleboro, Vermont, where Plastolite plastic lenses are made, all foreign matter is excluded which might impair the quality. Not only are the premises dust-free, lint-free and air conditioned—the workers wear special clothing! What's more, AO Plastolite lenses undergo a multitude of tests and inspections. Result: lenses with the optical properties traditional with AO that conform to the highest known standards!

RECOMMENDED USES:

For workers exposed for long periods . . . women workers . . . supervisors, foremen, plant visitors. Especially desirable for electronics work and spot welding. AO Plastolite lenses provide excellent protection against impact particularly where flying particles are small and acid exposures are no problem. NOTE THE LIGHT WEIGHT OF THESE LENSES *IN YOUR HANDS* AND *OVER YOUR EYES!*

AVAILABLE ON YOUR FAVORITE AO GOGGLE

AO Plastolite lenses are available as 6 curve lenses in all eye sizes on your favorite AO safety goggle. Your nearest AO Safety Products Representative can supply you with this outstanding advance in eye protection.

AO's Industrial Vision Program Increases Production, Decreases Accidents. Write today for booklet "Improved Industrial Vision."

American Optical

SAFETY PRODUCTS DIVISION

SOUTHBRIDGE, MASSACHUSETTS • BRANCHES IN PRINCIPAL CITIES

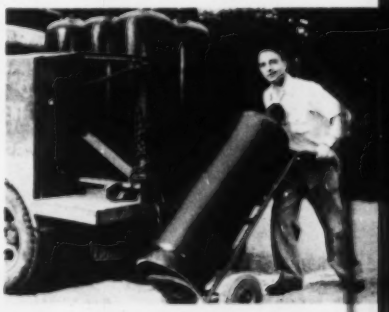
Facts you should know about U·S·S HIGH STRENGTH STEELS

SWITCHING TO HIGH-STRENGTH STEELS PAYS OFF FOR LP-GAS CYLINDER MAKERS

In two years they get 806,000 extra cylinders from their steel allotment... and release 33,600 tons of steel for other uses.

● By changing from carbon steel to lighter gage high-strength steel, manufacturers of LP (liquefied petroleum) Gas cylinders have secured three important benefits. (1) They now get up to 32% more production from each ton of steel used. (2) In two years they have been able to turn out more than three-quarters of a million cylinders that would never have been produced if carbon steel had been used; and in so doing (3) they have saved 33,600 tons of steel badly needed elsewhere—a handsome contribution to the nation's economy.

Most of this high-strength steel is U·S·S MAN-TEN. Because MAN-TEN has a yield point 50% higher than plain carbon steel, manufacturers were able to reduce the thickness of the steel sheets from which the cylinders are made. This meant a reduction of over 24% in the weight of the finished LP-Gas cylinders. And, because MAN-TEN has substantially greater resistance to impact, abrasion and atmospheric corrosion, the lighter cylinders are just as strong—if not stronger—than their heavy predecessors. Proof of their ability to stand up in service is the fact that these lighter containers are approved for use in interstate commerce by the ICC.



In this case—like so many others—the change-over to U·S·S MAN-TEN brought other benefits, too. Freight costs—both from our mills and from the fabricators' plants—were cut proportionately. Carload shipping costs to a customer 500 miles away were reduced about $100. Gas companies like the lighter cylinders because they're easier to fill, handle and store. And the men who deliver gas "beyond the mains" are even more enthusiastic, for more than 20 pounds have been lopped off the weight of cylinders used for domestic service. This means a tremendous amount of back-breaking labor saved on every truck delivery by using lightweight MAN-TEN cylinders.

If you would like additional information on this grade of U·S·S High Strength Steel, use the convenient coupon attached.

OTHER APPLICATIONS OF U·S·S MAN-TEN

- Asphalt Mixers
- Booms
- Bridges (Riveted)
- Buckets (Power Shovel)
- Cars
  - Air Dump
  - Industrial
  - Metal Mining
  - Mine Skips and Cages
- Chutes
- Concrete Mixers
  - Blades
  - Framing
  - Head
  - Shell
- Cranes
  - Crawler
  - Truck
  - Booms
  - Framing
- Cylinders
  - Liquefied Petroleum Gas (ICC Regulations)
- Derricks
- Dipper Sticks
- Earthmoving Equipment
  - Booms
  - Buckets
  - Bulldozers
  - Chutes
  - Conveyors
- Ditchers
- Dump Truck Bodies
- Graders
- Road Rollers
- Scrapers
- Trenchers
- Fan Blades
- Ground Anchors
- Hoisting Drums
- Monorail Systems
- Ore Unloaders
- Screens, Vibratory
  - Structural Members
- Ships
  - Ore Boats: Tank Tops and Sides
- Shovels
  - Excavating
- Scaffolding, Portable
- Snow Plows
- Street Sweepers
- Tanks: Fuel Oil Storage (Above Ground)
- Trailers
  - Logging Trailer Frames
- Trucks
  - Dump
  - Industrial
  - Lift

What is U·S·S MAN-TEN?

● U·S·S MAN-TEN is a grade of manganese-copper steel that, at relatively low cost, provides toughness, workability and weldability in a higher degree than obtainable in carbon steel of the same strength level. Its atmospheric corrosion resistance is two times that of carbon steel and slightly higher than that of copper steel.

U·S·S MAN-TEN, in thicknesses up to ½" inclusive, has a yield point of 50,000 psi min. and tensile strength of 75,000 psi min. Its abrasion resistance is greater than that of structural carbon steel (ASTM A7); its resistance to shock is about 20% greater; its fatigue strength is approximately 40% higher, insuring greater ability to withstand vibration and reversal of stresses.

U·S·S MAN-TEN is produced in plates, shapes, bars, sheets, strip, special cold-formed sections and other forms. It is particularly recommended for use in light and intermediate thicknesses.

United States Steel Company
525 William Penn Place, Room 4330
Pittsburgh 30, Pennsylvania

Please send me a copy of your book "U·S·S MAN-TEN."

Name ..... Title .....

Company .....

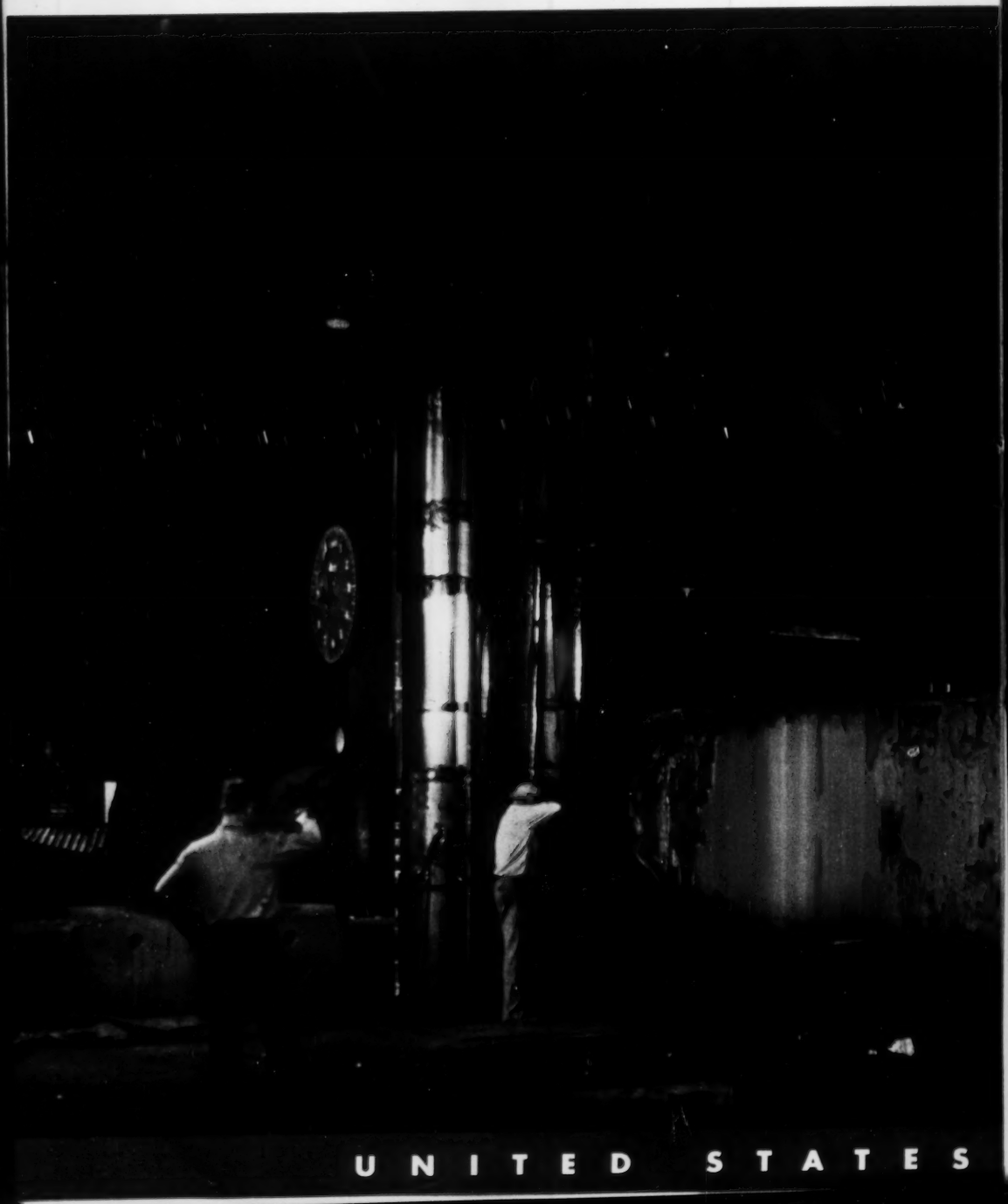
Address .....

City ..... State .....

USS

UNITED STATES STEEL

"My crew is as good as



UNITED STATES

you can find"

says Alex Janathan,

U. S. STEEL PRESSMAN

● If you were to visit the forge shop at our Homestead District Works, you'd want to see the 7,000-ton press at work. This isn't our biggest press, or our smallest, but it handles some of our most interesting jobs.

The entire crew—press driver, manipulator operator, craneman and helpers are under the direction of Alex Janathan who started in the open hearth when he was 16. If you talked to Alex, here's about the way the conversation might go:

YOU: *"What did you do after you left the open hearth?"*

JANATHAN: "When I left the open hearth, after 3 years, I was first man on the ladle. Then I went to the Heat Treating and Forge Department and worked on the alloy plate shears for 3 years."

YOU: *"And you've stayed in the forge department ever since?"*

JANATHAN: "Yes, at different jobs. After working the shears, I went burning for 3 years—cutting locomotive side frames out of slabs. It was a new idea to replace castings. While I was burning, I got turns as helper on the 3,000-ton press. I worked as press driver, then in '34 was made pressman."

YOU: *"So you've been a pressman now for about 18 years. Did you work on other presses, too?"*

JANATHAN: "I've worked every press we own."

YOU: *"Do you specialize on any one type of product?"*

JANATHAN: "No. I make turbine and generator shafts, every kind of alloy and stainless steel forgings. I also make water wheel shafts, U-plates, half-circles, as well as drop hammer bases and columns."

YOU: *"What's one of your biggest problems while you're forging these big jobs? What do you have to watch for?"*

JANATHAN: "Well, there's the problem of ingots that don't cool evenly while they're on the press."

YOU: *"What causes that?"*

JANATHAN: "When the ingot comes from the furnace, it's evenly heated all the way through, but it's covered with scale. While we work it, sometimes the scale gets knocked off on just one side; so that side cools faster than the side that's insulated with scale. When we forge a piece like that, the hot, or scale side flows outward faster than the cool side, and the piece will not forge accurately."

YOU: *"What do you do then?"*

JANATHAN: "First, we try to remove scale evenly from the ingot. But if it still cools unevenly, we spray the hot side with water until the temperature is even all around. Then the ingot flows the same on all sides. Even ingot heat is awfully important. . . . If it cools too much, the corners start to tear, especially when you're forging alloy and stainless steels. These things are important because we work to such close tolerances. Take a 55" ingot. When we forge a die block bloom from that ingot we reduce it to 37" x 21" and only have ¼" tolerance."

YOU: *"As far as you're concerned, what's the most important factor in making good forgings?"*

JANATHAN: "First, you have to have good steel. We make our own so that's never a problem. Then you have to have good equipment. We've got the best. But most important is the crew. Mine for example. Turnover is small. Every man knows his job and has been on it for years. I've visited a lot of forge shops, but my crew is as good as you can find."

• • •

When you buy forgings from United States Steel Company, men like Alex Janathan and his crew work on them. We'll match their skill against the best in the land. For more information on U·S·S Quality Forgings, write to United States Steel Company, 525 William Penn Place, Pittsburgh 30, Pa.

USS *Quality*

STEEL

Facts you should know about U·S·S STAINLESS

U·S·S 17 Stainless [Type 430] in good supply; may serve as acceptable alternate for scarce nickel-bearing grades

IF shortages of nickel-bearing grades of Stainless Steel are cutting into your production, give careful consideration to alternate all-chromium grades such as U·S·S 17 (Type 430) and U·S·S 12 (Type 410).

Both these grades are in relatively plentiful supply today. Of the two, U·S·S 17 is most suitable for general use. U·S·S 17 is not a new grade; it was used successfully even before the nickel-bearing grades. Techniques for handling and using it are thoroughly developed and are available to you.

Many manufacturers have already switched to U·S·S 17 successfully. But such a change demands careful attention to problems of fabrication as well as conditions of end use.

Our sales engineers will be glad to advise you on the use of U·S·S 17 for your application, and recommend proper fabricating techniques. A sample order and trial run may show you that U·S·S 17 Stainless Steel is the answer to your current problems.

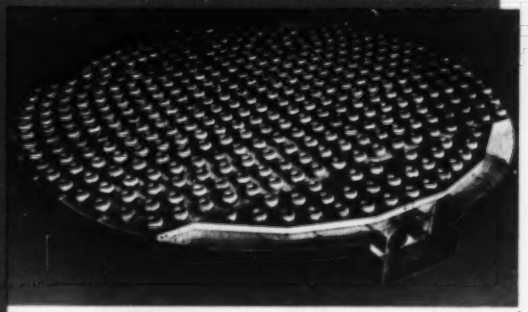
PHYSICAL AND MECHANICAL PROPERTIES OF U·S·S 12 and U·S·S 17

	U·S·S 12		U·S·S 17	
A. I. S. I. DESIGNATION	**TYPE 410**		**TYPE 430**	
Carbon	0.15 Max.		0.12 Max.	
Manganese	1.00 Max.		1.00 Max.	
Phosphorus	0.04 Max.		0.04 Max.	
Sulphur	0.03 Max.		0.03 Max.	
Silicon	1.00 Max.		1.00 Max.	
Chromium	11.50-13.50		14.00-18.00	
Density				
lb./cu. in.	0.28		0.28	
low carbon steel (SAE 1020) = 1.00	0.97		0.97	
Specific Electrical Resistance at 68 deg. F				
microhms cm.³	57		60	
microhms in.³	22.4		23.6	
low carbon steel = 1.00	5.2		5.5	
Melting Range deg. F.	2700-2760		2600-2750	
Structure	Martensitic		Ferritic	
Magnetic Permeability				
as annealed	Ferro-magnetic		Ferro-magnetic	
after 10% reduction of area	Ferro-magnetic		Ferro-magnetic	
Specific Heat				
cal. deg. C. gm. (0 to 100 deg. C.)	0.11		0.11	
B.t.u. deg. F. lb. (32 to 212 deg. F.)	0.11		0.11	
low carbon steel = 1.00 (0 to 100 deg. C.)	1.0		1.0	
Thermal Conductivity				
cal. cm.² sec. deg. C. cm. at 100 deg. C.	0.0595		0.0625	
B.t.u. sq.ft. hr. deg. F. in. at 212 deg. F.	173		181	
low carbon steel = 1.00 at 100 deg. C.	0.52		0.54	
cal. cm.² sec. deg. C. cm. at 500 deg. C.	0.0686		0.0627	
B.t.u. sq.ft. hr. deg. F. in. at 932 deg. F.	199		182	
Coefficient of Thermal Expansion				
per deg. F. x10.⁶ (32 to 212 deg. F.)	5.5		5.0	
low carbon steel = 1.00 (32 to 212 deg. F.)	0.83		0.76	
per deg. F. x10.⁶ (32 to 932 deg. F.)	6.4		6.2	
	Annealed	Quenched and Drawn	Annealed	Cold Worked
Tensile Strength, 1000 lb. sq.in.	65-85	90-200	70-90	90-110
Yield Strength, 1000 lb. sq.in.	35-45	60-145	35-55	80-105
Modulus of Elasticity, 1000 lb. sq.in.	29	29	29	29
Elongation in 2 in. %	35-20	28-15	35-20	25-8
Reduction of Area %	75-60	75-60	60-40	
Izod Impact Strength, ft.-lb.	100-60	100-30		
Endurance Limit (Fatigue) 10³ lb. sq.in.	30-50	40-100	35-50	
Brinell Hardness Number	135-165	180-325	145-185	
Rockwell Hardness Number	B75-85	C10-41	B75-90	B90-C23
Olsen Value, inches	0.4-0.3		0.4-0.3	
Stress Causing 1% Elongation (Creep) in 10,000 Hours				
At 1000 deg. F. lb. sq.in.	12000		8500	
At 1200 deg. F. lb. sq.in.	2000		2200	
At 1350 deg. F. lb. sq.in.	1400		1200	
At 1500 deg. F. lb. sq.in.				
Scaling Temperature, deg. F. (approx.)	1300		1550	
Initial Forging Temperature, deg. F.	2000-2200		1900-2050	
Finishing Temperature, deg. F., Maximum	1500		1300	
Annealing Treatment	Furnace cool to 1100 from 1500-1650 deg. F.		Air cool from 1500-1400 deg. F.	

Applications where straight chromium Stainless Steel has been suggested as an alternate to unavailable grades

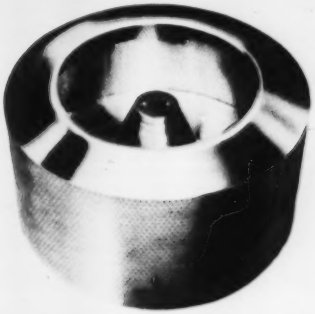
- Air Cylinder Rods and Sleeves
- Backing Strip for Boiler Casings
- Beverage Faucet
- Boiler Baffles
- Burner Tops for Domestic Ranges
- Cabinets for Army Hospital Dispensary Service
- Cafeteria Equipment
- Carbonator Tanks
- Coal Chutes
- Coal Screens—Air-Cleaning Tables Conveyors • Flume Liners • Shakers Trough Liners • Vibrating Wedge Slot—Dewatering • Woven Wire
- Coal Refuse Bin Liners
- Conveyor Adjusting Screws
- Dials for Milking Machines
- Dish Tables, Sinks—Cafe Counters Food Preparing, Serving & Storage Equipment
- Drawers in heated food storage cabinets
- Eave Troughs
- Elevator Trim
- Expansion Joints
- Field Ovens
- Flue Section in Patented Chimney
- Food Cabinets
- Food Preservation Machinery
- Food Processing Equipment
- Fuel Gas Regulator Bushings & Nozzles
- Gas Burners
- Hospital Tables
- Hospital Ware—Bed Pans, Sterilizing Trays, Surgical Room Tray
- Household Refrigerator Evaporator
- Kitchen Equipment
- Laundry Equipment
- Locomotives
- Medicine, Narcotic, Instrument & Sterilizer Cabinet Sinks & Countertops
- Milk Cooler Liners
- Milling Machine Dial
- Miscellaneous Hospital Equipment
- Olive Oil Storage Tank
- Popcorn Machines
- Press Plates for Plastic Impregnation
- Radial Support for Range Heater
- Railroad and Bus Car Seat Backs
- Railroad Passenger Car Repairs
- Refrigerator Trim
- Roof Covers
- Signs
- Sink Bowls
- Sink Tops
- Sinks—Countertops, Drainboards
- Sludge Pump Piping
- Soda Fountains
- Space Heater Burner Units
- Subflooring for Passenger Cars
- Surgical Dressing Carriage
- Switch Frames
- Tops for Cook Tables
- Tower Fan Blades for Aviation Gasoline Refineries
- Trailers—Front Roof Stamping
- Trim for Front of Locomotives
- Water Filter Tank

STEEL



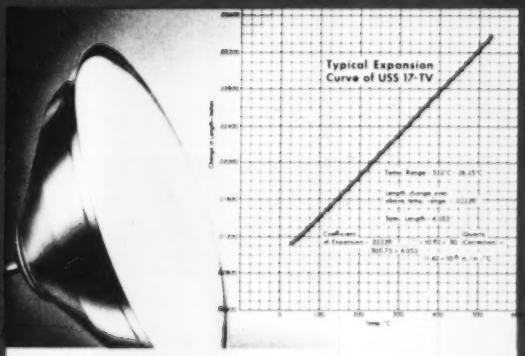
U·S·S 12 used for bubble cap trays since 1938

Straight-chromium Stainless Steels are nothing new; they've proved themselves in a wide variety of applications. Fritz W. Glitsch and Sons, Inc., Dallas, Tex., has fabricated bubble cap trays from U·S·S 12 Stainless Steel (Type 410) since 1938. More than 500 of these trays were placed in service more than 10 years ago. Their durability and corrosion resistance have been demonstrated in thousands of hours of service.



Laundry equipment manufacturer switches to U·S·S 17 Stainless Steel

A prominent manufacturer of automatic laundry equipment has met NPA regulations by changing from Type 300 series Stainless Steel to U·S·S 17 for extractor baskets. These baskets operate at high speed to remove water from clothes by centrifugal force. Changes were made successfully in fabricating methods to handle this straight-chromium grade of Stainless Steel.



Expansion curve of U·S·S 17-TV

U·S·S 17-TV Stainless Steel was developed especially for use in the shells of television picture tubes. Its coefficient of expansion makes possible a vacuum-tight seal with the glass face plate of the picture tube. If you're planning a product that demands a tight metal-to-glass seal, examine this curve carefully. U·S·S 17-TV is available now.

U·S·S 17 for walls and roofs

Wall panels, such as the ones being erected on a warehouse shown here, are of Type 430 Stainless. They are finding wide acceptance today for use as exteriors of industrial and semi-industrial buildings.

USS STAINLESS STEEL UNITED STATES STEEL

ARMCO STEEL & WIRE . . . COLUMBIA-GENEVA STEEL . . . NATIONAL TUBE . . . TENNESSEE COAL & IRON
UNITED STATES STEEL SUPPLY, WAREHOUSE DISTRIBUTORS . . . Division of UNITED STATES STEEL CORPORATION, PITTSBURGH
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

UNITED STATES STEEL

Facts you should know about

U·S·S CARILLOY STEELS

U·S·S CARILLOY BORON STEELS PROVE EFFECTIVE IN CONSERVING "CRITICAL" ALLOYS

● Today American industry is faced with the unpleasant fact that, after military needs are met, there is not nearly enough nickel and molybdenum available to produce steels containing these alloys. Actually the alloy shortage is worse now than in World War II.

However, insofar as heat treating steels are concerned, the picture is not as grim as it might be. For in the last war, the potentialities of the element boron for increasing the hardenability of steel became widely recognized and thousands of tons of boron steels were produced by United States Steel and used in military equipment, such as armor, projectiles, torsion springs for tanks, etc.

These and post-war applications of boron steels in large diesel locomotive crankshafts, heavy-duty tractor axles, in wrenches and hand tools, have thoroughly demonstrated boron's ability to replace several hundred times its own weight of other hardening alloys such as nickel, chromium, molybdenum and manganese. Not only have boron steels helped to conserve these critical alloying elements, where they are necessary only for adequate hardenability, but they have effected considerable savings both in the cost of steel and in fabricating costs as well.

U·S·S SuperKore—a pioneer boron steel

More than six years ago, United States Steel Company developed U·S·S SuperKore A, which is essentially a 4312, plus boron and 0.03-0.07% vanadium. Used by a leading aircraft engine builder, this steel (designated as TS 43BV12) has successfully replaced 3310, in heavy-duty gears, shafts and pinions for large air-cooled reciprocating engines and is approved for aircraft use under AMS Spec. 6266. Not only does SuperKore A save one-half the nickel and two-thirds the chromium formerly required but the manufacturer reports improved carburizing characteristics—with less retained austenite and fewer undissolved carbides on direct quenching.

Similarly, U·S·S SuperKore AA—a 4315 plus boron—shows improved hardness near the surface and large tonnages have been used by a leading heavy-duty truck builder who reports that transmission countershafts made from it have been in service for five years with excellent results. Used to replace 4800 types, this steel now designated as TS 43BV14 reduces nickel and molybdenum requirements by one-half.

Another U·S·S SuperKore Steel—SuperKore B—which is a 4615 plus boron, designated TS 46B12, has been successfully used for more than three years to replace 4812, in making a famous line of rock bit cutters, and saves one-half the nickel formerly required.

U·S·S SuperKore C—a 8615 plus boron—originally developed to replace 4300 carburizing grade, and which reduces nickel by one-half and molybdenum by one-fifth has shown good results.

Our work on these alloy-saving carburizing steels has shown that lower alloy steels containing boron will have the same core properties as the higher alloy steels they match in hardenability. In addition to conserving critical alloys they (1) improve hot and cold working, (2) require a shorter annealing cycle, and (3) have improved machinability. All these factors result in fabricating economies.

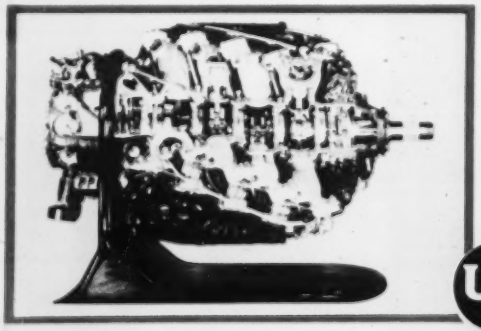
Because in some cases boron steels require more care in their selection and treatment than do the conventional alloy steels, we offer you the assistance of our metallurgists who have pioneered their development and whose practical cooperation will be of material benefit in applying boron steels to your equipment. Simply write United States Steel, 525 William Penn Place, Pittsburgh 30, Pa., Room 4330.

There are other approaches to the alloy problem

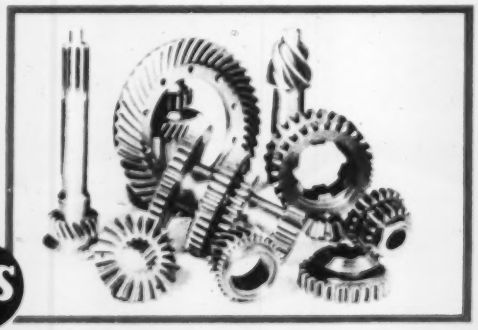
Although the substitution of boron steels for standard alloy grades has enabled many customers to meet their requirements, such substitution is only one of the ways our metallurgists and research specialists are able to solve today's alloy problems.

For example, in some cases, emergency alloys, without boron, have proved entirely satisfactory. In others, improved heat treating procedures have provided adequate hardness and other physical properties in lean standard alloy steels.

In addition to the use of U·S·S SuperKore A in this engine, SuperKore steels are being used in other aircraft power plants.



Heavy-duty truck transmission gears and rear differential gears and pinions such as these are made of U·S·S SuperKore AA.



USS

Columbia-Geneva Steel · Tennessee Coal & Iron · United States Steel Supply · American Bridge

Division of United States Steel Corporation, Pittsburgh

United States Steel Export Company, New York

UNITED STATES STEEL

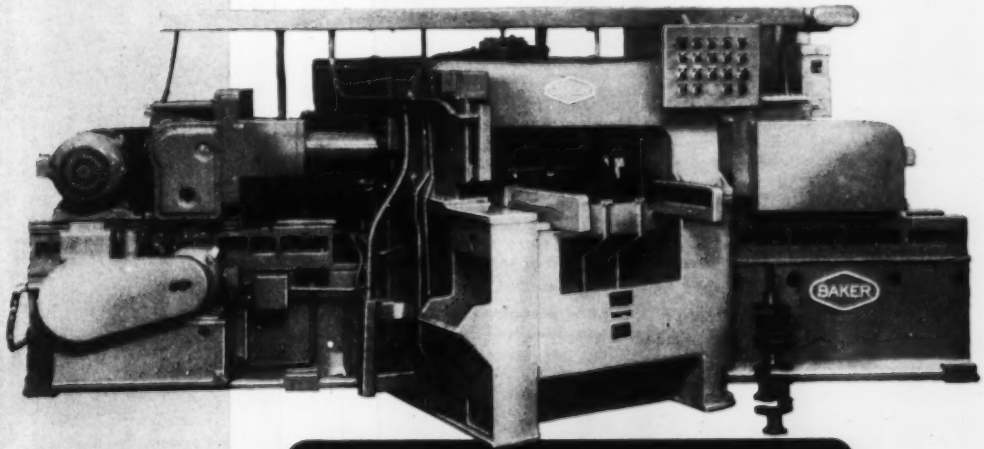
YOU'LL GET

Speed and Precision

with BAKER

SPECIAL MACHINES

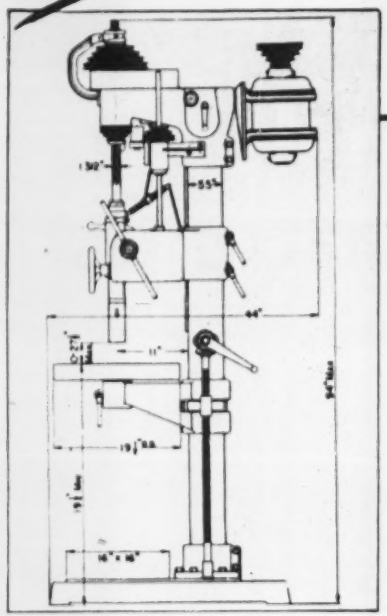
Precision productivity is the "watchword" with industry today, which makes BAKER special machines a necessity to keeping up production schedules and reducing part costs per man hour. The machine illustrated is a Baker four-station automatic transfer type machine for drilling 1" diameter lightning holes through crank pin bearings. Utilizing two standard Baker 7½ x 16 horizontal hydraulic feed saddle type drilling units, the Baker is capable of a production rate of 43.8 pieces per hour at 100% efficiency. Outside hydraulic pump sump units furnish hydraulic power for the two 7½ x 16 drilling units. The machine is a four-station, automatic transfer machine. Whatever your drilling problem, consult Baker engineers regarding a Baker special machine that will give you increased productivity at lower cost per man hour.

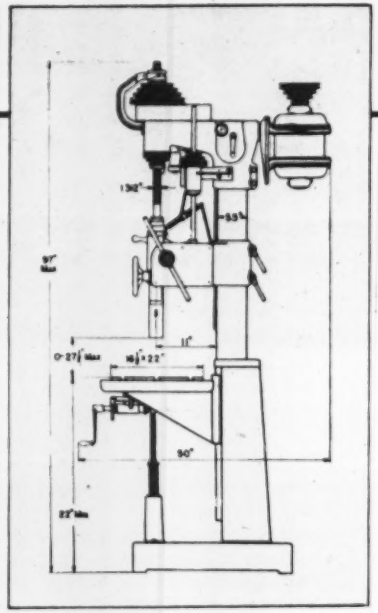


BAKER BROTHERS, INC., Toledo, Ohio

DRILLING . . . TAPPING . . . KEYSEATING and CONTOUR GRINDING MACHINES

See Why THIS DRILL CAN HANDLE Your Heaviest Jobs—





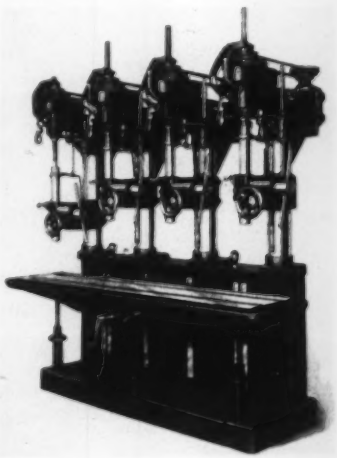
"Buffalo" No. 22 DRILL

• *Far Left,* (diagram) Overall Dimensions Of Round Column Model

• *Left,* (diagram) Overall Dimensions Of Pedestal Type Model

The dimension diagrams above show what this No. 22 Drill can do in your shop. It drills to the center of a 22" circle—adjusts from 0 to 27½" between working table and spindle nose—has a 5.5" steel column and a sturdy spindle that's 1.312" in least diameter. Here's a rugged, durable machine that will stand up under punishing schedules. Here's a machine to take large work pieces. And, as the diagrams show, controls and adjustment cranks are placed within easy reach of the operator—for minimum fatigue and maximum work flow. Also, construction is such that the overall height can be changed to meet special space requirements such as low ceiling. Available in one to four spindles with a wide variety of feeds and special attachments if desired.

WRITE FOR BULLETIN 2989-F.



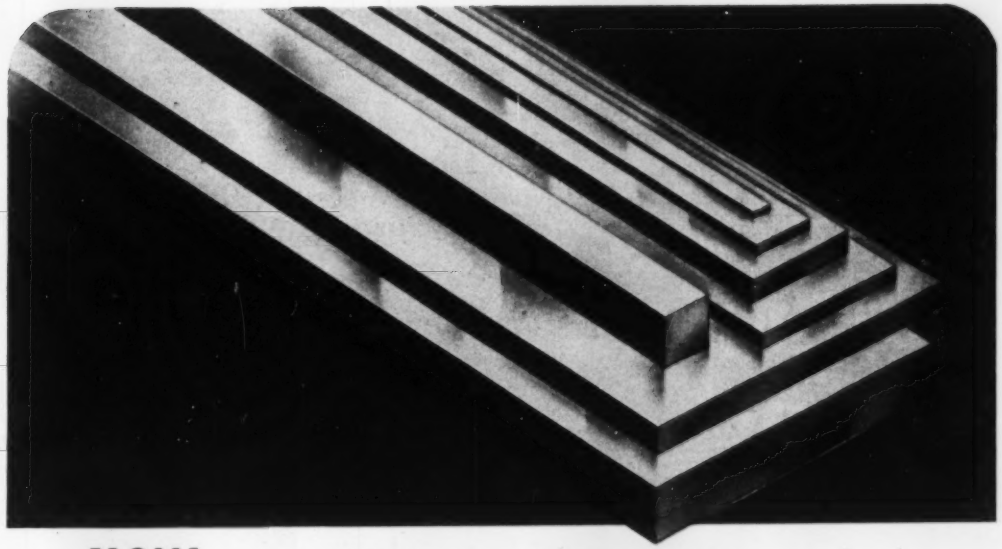
"Buffalo" MACHINE TOOLS

BUFFALO FORGE COMPANY

158 MORTIMER STREET BUFFALO, NEW YORK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

DRILLING PUNCHING SHEARING CUTTING BENDING



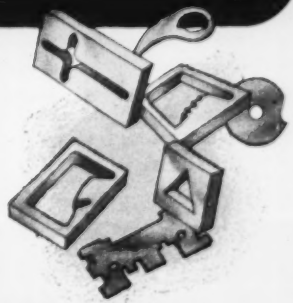
NOW... in addition to Oil-Hardening...

You can also offer this

NEW AIR-HARDENING SIMONDS DIE STEEL

For longer-lived punches and dies . . . where greater production runs are needed between sharpenings . . . you can now get this new *Air-Hardening* type of Simonds Ground Die Steel, *which produces up to 50% more pieces per sharpening.*

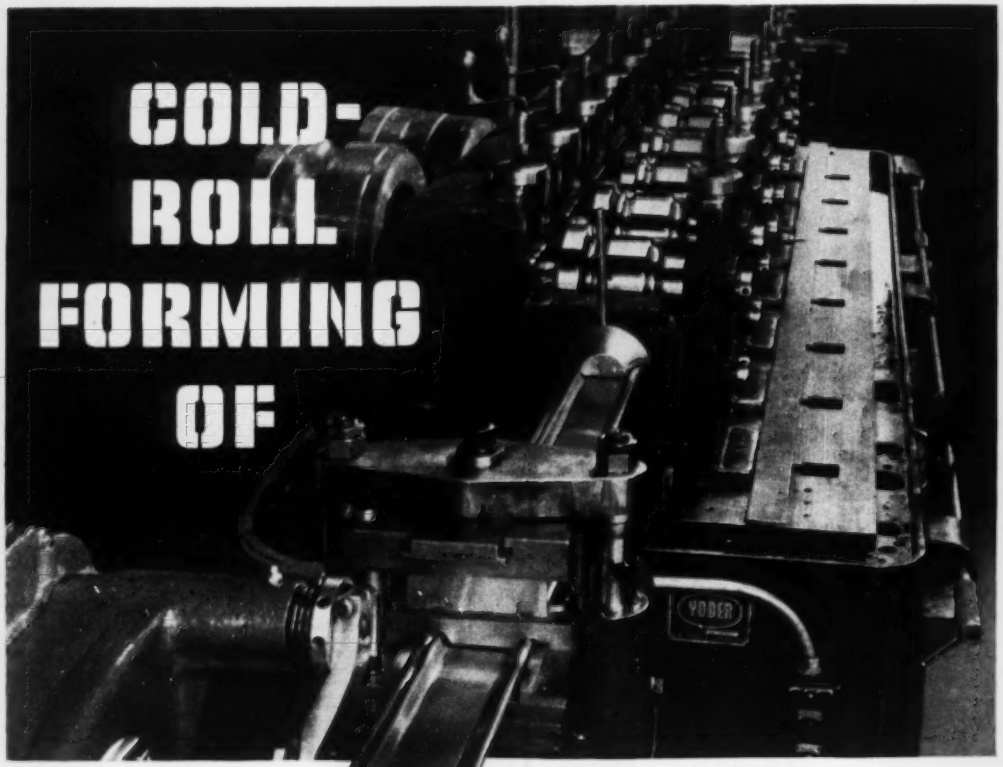
5% chrome content makes this Air-Hardening Steel more wear-resistant and therefore better suited for punches and dies used on silicon or stainless steels, Monel, or other abrasive metals, and for gages and tools requiring top wear-resistance. What's more, this new *non-deforming* die steel is spheroidize-annealed for good machinability and consistently uniform hardenability. Wide hardening range of 1700 to 1800° F. makes it practically foolproof in heat-treating.



Furnished in many stock sizes in 36" lengths, all sizes are accurately ground to a thickness limit of plus or minus .001" with an extra-smooth surface finish of 25 to 35 micro-inches. Each piece is individually packaged, ready for scribing, shaping and heat-treating. See your Industrial Supply Distributor today.

SIMONDS
SAW AND STEEL CO.

Factory Branches in Boston, Chicago, San Francisco and Portland, Ore. Canadian Factory in Montreal, Que.



Pre- Coated Stock

● When roll forming is not to be followed by other operations which may damage fine finishes, it is common practice to use stock which has already been given the finish ultimately desired. Because, with proper design, roll pressures can be held extremely low, and the further fact that the metal is not heated, the process permits a wide freedom of choice in decorative and protective finishes.

Large quantities of hot dipped galvanized stock are being cold-roll formed. Electro galvanizing and plating with chromium, brass and copper most easily meet roll-forming requirements. So also metal which has been polished, burnished, buffed or similarly treated.

Roll-forming of stock which has been painted or given other organic coatings, is also practical. Better coatings are constantly being developed for this purpose.

Thickness of stock, design of profiles, kind of coating desired, and number of roll passes, are the principal factors to be taken into account.

The services of Yoder engineers are at your disposal in finding the best answer to problems of this kind. Yoder Book on Cold-Roll-Forming is yours for the asking.

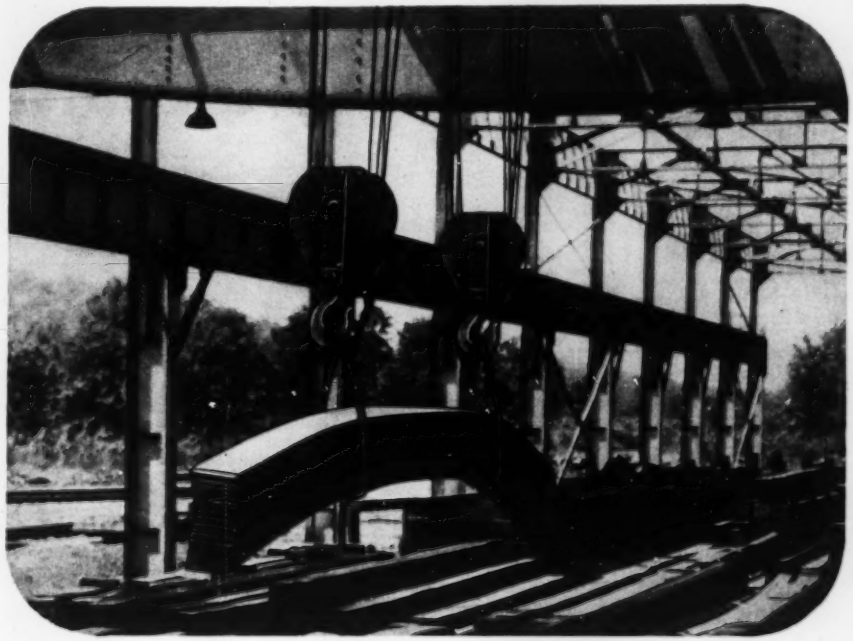
THE YODER COMPANY • 5502 Walworth Ave., Cleveland 2, Ohio

Complete Production Lines

- ★ **COLD-ROLL-FORMING and auxiliary machinery**
- ★ **GANG SLITTING LINES for Coils and Sheets**
- ★ **PIPE and TUBE MILLS–cold forming and welding**

ENGINEERING YODER MANUFACTURING

WIRE ROPE



This is the longest-lasting rope we've ever made for industrial use

ROEBLING HAS been making wire rope for more than a hundred years. And during all that time we've been developing new kinds of rope, and making them better.

Today, about the first thing you ask about a wire rope is, "Has it got what it takes? Will it stand up and cut replacements?"

Our answer is an emphatic *yes*, because Roebling Preformed Blue Center Steel Wire Rope meets the severest tests of tensile strength, abrasion resistance and general toughness.

There's a Roebling rope that will prove the longest-lasting and most economical in your operations. Call on your Roebling Field Man for his recommendations. John A. Roebling's Sons Company, Trenton 2, New Jersey.

ROEBLING

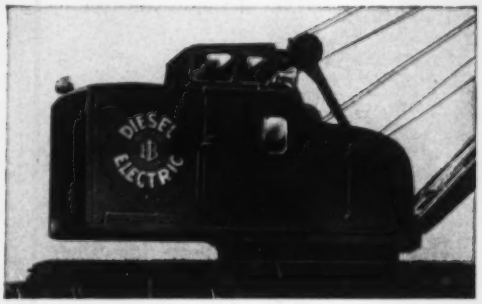
ATLANTA, 924 AVON AVE • BOSTON, 51 SLEEPER ST • CHICAGO, 5525 W. ROOSEVELT RD • CINCINNATI, 3253 FREDONIA AVE • CLEVELAND, 701 ST. CLAIR AVE, N. E. • DENVER, 4801 JACKSON ST • DETROIT, 915 FISHER BLDG • HOUSTON, 6216 NAVIGATION BLVD • LOS ANGELES, 5340 HARBOR ST • NEW YORK, 19 RECTOR ST • ODESSA, TEXAS, 1920 E. 2ND ST • PHILADELPHIA, 230 VINE ST • SAN FRANCISCO, 1740 17TH ST • SEATTLE, 900 1ST AVE S. • TULSA, 221 N. CHEYENNE ST • EXPORT SALES OFFICE, TRENTON 2, N. J.

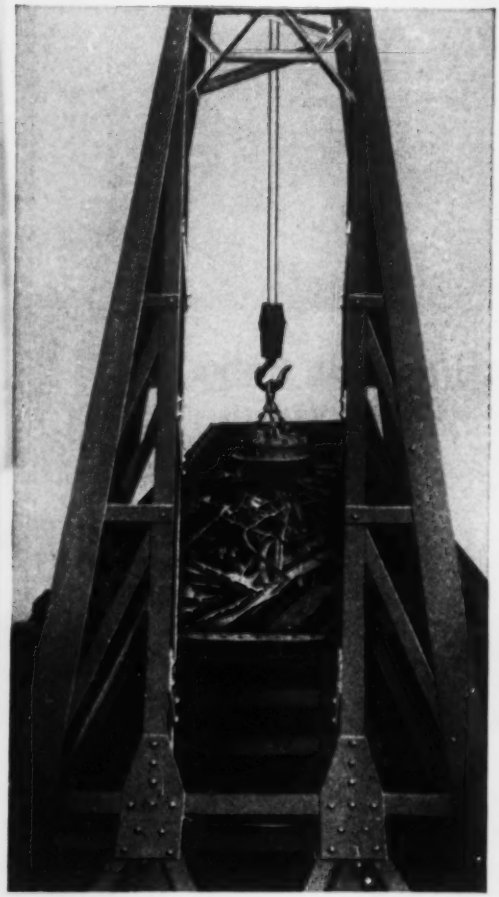
BROWNHOIST – THE ONLY LOCOMOTIVE-CRANE CAB THAT PROVIDES A CLEAR VIEW IN EVERY DIRECTION

Approximate visibility from ordinary cab.

Approximate visibility with operator on side.

360 degree visibility from new Industrial Brownhoist Monitor-Type Cab.





Mounted high in the crane and surrounded by large windows, the operator in a Brownhoist patented Monitor-Type cab has full 360° visibility – forward, backward, and to both sides – providing safer operation, faster, more efficient loading and unloading. In addition the new Clear-Vision Boom is another Brownhoist feature that permits the operator an unobstructed view of his work. When unloading from high-walled railroad cars he can see right into the car.

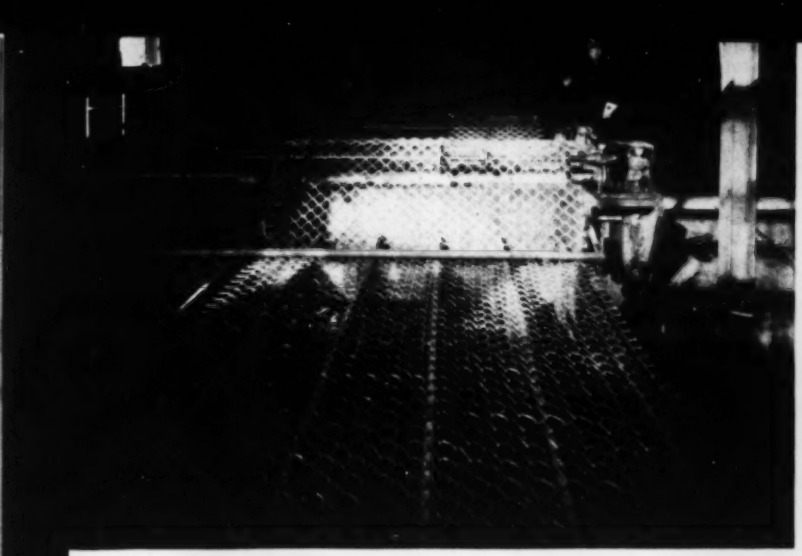
The Monitor-Type cab is also designed for the safety and comfort of the operator. All controls are conveniently located and can be easily reached from a comfortable, well-raised seat. There's a soundproof partition between the operator and the machinery. There are doors on both sides of the cab and there's a 14" safety clearance between car body and rotating upperworks.

Brownhoist Diesel and Diesel Electric Locomotive-Cranes are available in capacities from 20 tons up for speeding materials handling with magnet, hook or bucket. Write today for complete information.

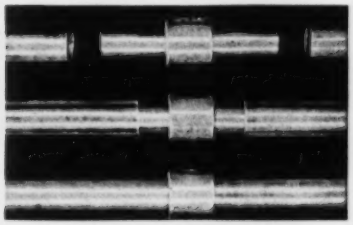
BROWNHOIST BUILDS BETTER CRANES

INDUSTRIAL BROWNHOIST CORPORATION, BAY CITY, MICHIGAN

DISTRICT OFFICES: New York, Philadelphia, Cleveland, San Francisco, Chicago, Canadian Brownhoist Ltd., Montreal, Quebec. **AGENCIES:** Detroit, Birmingham, Houston, Los Angeles. 148



TERMINAL POSTS AND POST TOPS

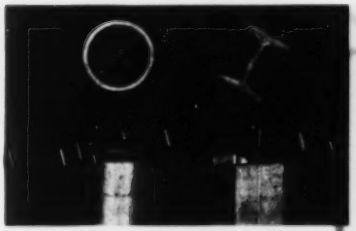


NEW TOP RAIL COUPLING

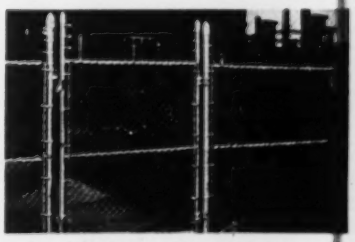
*CONTINENTAL Fence Features For Long-Lasting Property Protection

- Fence fabric is hot-dip galvanized—after weaving
- Heavy, modern post caps and barb-wire arms
- Snug-fitting inside-outside couplings
- Sturdy, closely spaced line posts in two styles
- Improved, pivot-type hinges—welded gates
- Extra ties hold fence fabric securely to posts and rails

You get more dollar value fence protection with Continental Chain Link fence. Rugged fabric is galvanized after weaving . . . heavier line posts and rails keep Continental fence in perfect alignment. Easier-operating gates swing on improved pivot hinges, and you get more ties to secure the fabric for longer fence life. Continental fence engineers plan and erect your fence for most effective, low-cost property protection. Write Continental at Kokomo, Ind., or contact nearest sales office.

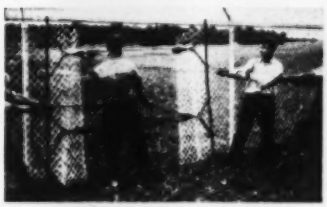


TUBULAR OR H-SECTION LINE POSTS



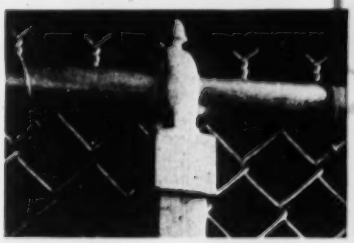
SMOOTH-OPERATING GATES

Planned and Erected to Fit Your Property



Continental's experienced fence engineers help you plan and lay out fence, tailored to fit your property.

Line posts are solidly set in concrete—fabric carefully stretched and secured for permanence.



MORE POST AND TOP RAIL TIES

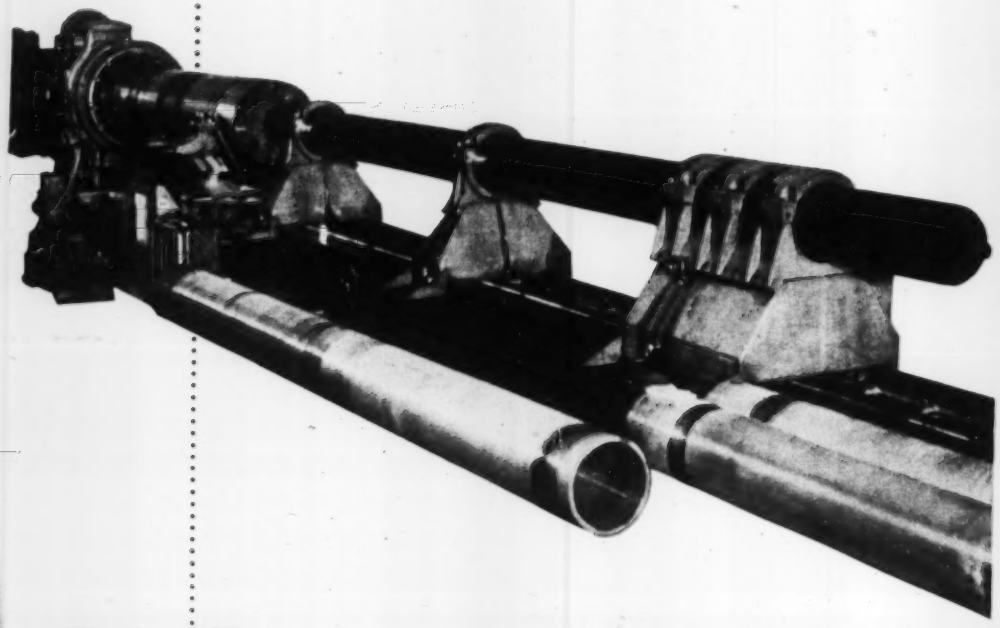
* Trade Mark Reg. U. S. Pat. Off.

CONTINENTAL STEEL

CONTINENTAL STEEL CORPORATION

GENERAL OFFICES • KOKOMO INDIANA

PRODUCERS OF *Manufacturer's Wire* in many sizes, shapes, tempers and finishes, including Galvanized, KOKOTE, Flame-Sealed, Coppered, Tinned, Annealed, Liquor Finished, Bright, Lead Coated, and special wire. ALSO, Coated and Uncoated Steel Sheets, Nails, Continental Chain Link Fence, and other products.



Rebuilt for new-machine accuracy

Re-engineered for greater capacity

It took some expert machine-tool engineering to convert a 72" boring lathe into this high-capacity, rapid-production machine. Here's how Simmons *Engineered Rebuilding* went to work for Sandusky Machine & Foundry Company, Sandusky, Ohio:

- **Original 72" swing increased to 84" clear over bed.**
- **Capacity increased to take 30" boring bar.**
- **New carriage has independent motor-operated feed and rapid traverse.**
- **Headstock raised; new castings made for tailstock and bar-rests.**

In addition to adding new capacity, Simmons completely rebuilt the original lathe... dismantled it down to bare castings and thoroughly cleaned it... replaced worn parts... refinished sliding surfaces.

Have you an unusual rebuilding job? Simmons' extensive engineering and manufacturing facilities are especially adapted to the rebuilding of every type of machine tool up to the largest sizes.

Give machine-tool rebuilding a priority in your plans for defense and consumer production. You can start by sending us a list of your machines that require rebuilding. We'll promptly quote prices and deliveries and send you case examples of machine tools rebuilt "The Simmons Way."

SIMMONS MACHINE TOOL CORPORATION
1755 North Broadway, Albany 1, N. Y.

SIMMONS ENGINEERED REBUILDING
Gives Machine Tools a New Lease on Life

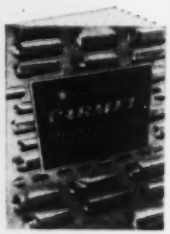
WALLACE BARNES COMPANY
BRISTOL, CONNECTICUT
F. N. MANROSS AND SONS CO.
BRISTOL CONNECTICUT
PLANT
ANN ARBOR MICHIGAN
THE WALLACE BARNES COMPANY LTD.
HAMILTON, ONT. CANADA
You can depend on
DIVISIONS OF ASSOCIATED SPRING CORPORATION

Tool up Quick ...Cut Faster

with

CARMET CARBIDE METAL

STANDARD TOOLS AND BLANKS



SEND NOW

for CARMET CATALOG C-2

. . . also for price list . . . great helps when you need tools fast.

This 28 page booklet shows the complete Allegheny Ludlum line of CARMET standard cutting-tool blanks and cutting tools, with specifications. *Write today!*

ADDRESS DEPT. S-26

Need cutting tools in a hurry? Just name the standard styles and carbide grades desired . . . get prompt shipment from a big stock *near* you.

Our line of carbide "standards" is complete. It covers 90% of all single-point operations. CARMET standard tools come ready to use . . . easy to modify for special purposes, by grinding. Style C, illustrated, is designed particularly for conversion into various shapes for numerous applications.

Other standard CARMET styles also are immediately available from local stocks.

Order CARMET tools and blanks for better, faster, cheaper cutting. There is a grade to take care of every need.

• *Allegheny Ludlum Steel Corporation, Carmet Division, Wanda and Jarvis Avenues, Detroit 20, Michigan.*

For complete **MODERN** Tooling, call

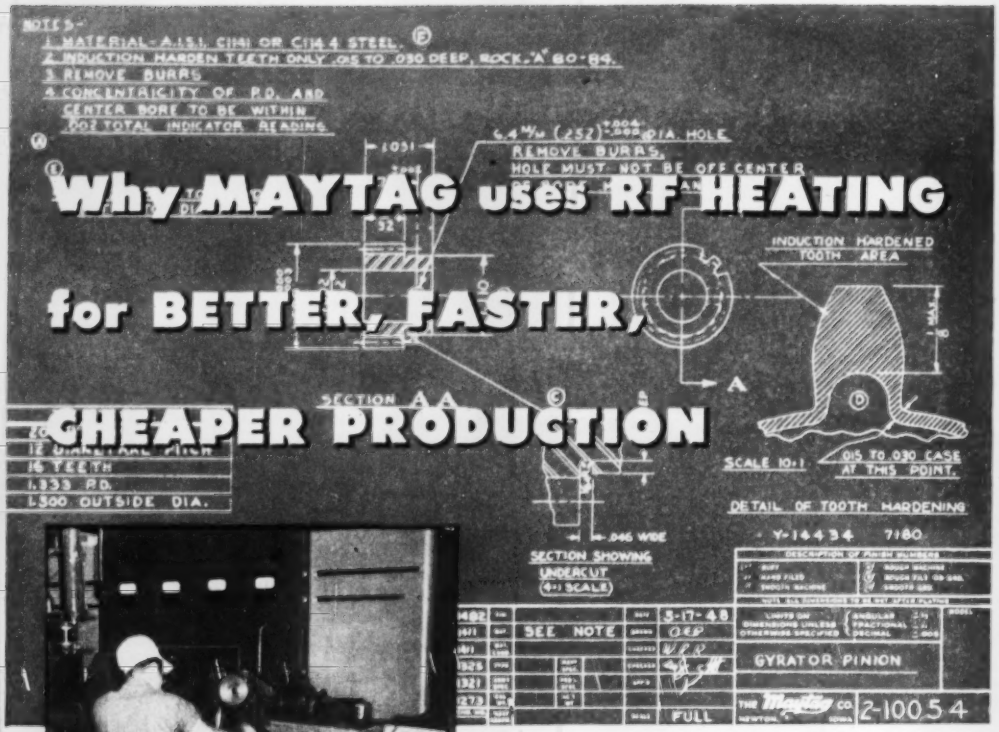
Allegheny Ludlum

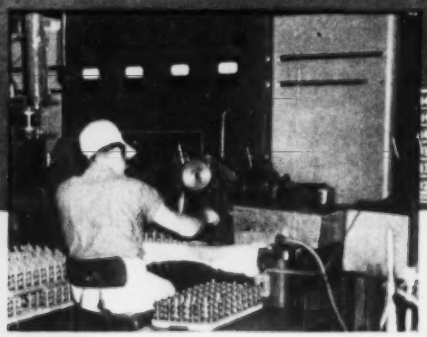
AL
FINE TOOL STEELS
SINCE 1854

WAD 3488

ERIE
ERIE
All Parts in Erie Hammers
Subject to Impact are STEEL
ERIE FOUNDRY COMPANY, ERIE, PA.
ERIE BUILDS Dependable HAMMERS

Why MAYTAG uses RF HEATING for BETTER, FASTER, CHEAPER PRODUCTION





● The Maytag Company has found, for fast production at low cost and high quality, Westinghouse RF Heating installations are the answer.

The installation of a process using two 20 KW-450 generators—for both spline and straight shaft hardening—has paid for itself in *less than 3 months!* This was shortly after World War II, and since then continued use has piled up real profit in savings.

In building a new plant for production of a completely new line of automatic washing machines, Maytag turned to induction heating for brazing and hardening . . . and they specified Westinghouse. A 50 KW and 10 KW RF generator, with associated work handling equipment, are now accounting for still further savings and continued high quality. That's why Maytag says that not only is the Westinghouse RF process the best method for heat treating production parts, but, also, "it produces precision work at the price of rough and ready work."

As we helped Maytag, let us help you solve your problems of increased production at low cost and with high quality. By all means, investigate the possibilities of installing Westinghouse RF Heating.

J-02241

Westinghouse Electric Corporation
Department S-41
2519 Wilkens Avenue · Baltimore 3, Maryland

Send me your informative case history booklet on induction heating.

Name

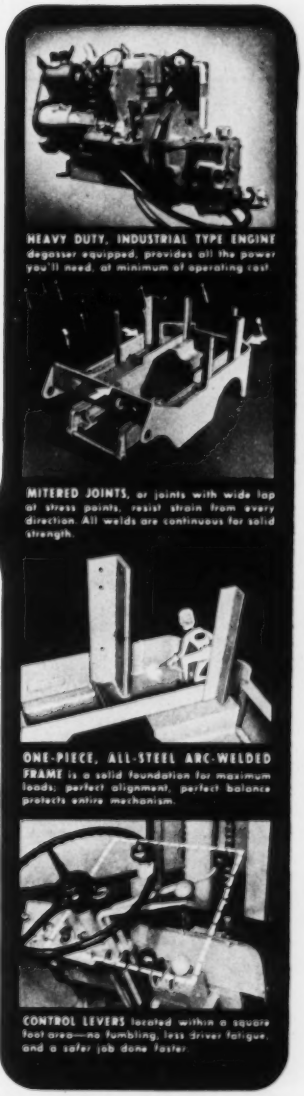
Company

Street

City Zone State

INDUCTION HEATING

ENGINEERED *all the way!*



HEAVY DUTY, INDUSTRIAL TYPE ENGINE degasser equipped, provides all the power you'll need, at minimum of operating cost

MITERED JOINTS, or joints with wide lap at stress points, resist strain from every direction. All welds are continuous for solid strength.

ONE-PIECE, ALL-STEEL ARC-WELDED FRAME is a solid foundation for maximum loads; perfect alignment, perfect balance protects entire mechanism.

CONTROL LEVERS located within a square foot area—no fumbling, less driver fatigue, and a safer job done faster

TOWMOTOR FORK LIFT TRUCKS ARE YOUR BEST ENGINEERING VALUE

Superior engineering in every detail gives Towmotor its broad-shouldered liking for responsibility. No coddling necessary—your Towmotor Fork Lift Truck will take all the gaff you can give it in any kind of materials handling job. Fast, agile and adaptable to the specific needs of your industry. Towmotor Trucks are cutting costs for users everywhere by job simplification, time, space, and manpower conservation. The reason: they're engineered *from the ground up*, with an in-built brute strength to provide continuous, round-the-clock service.

TOWMOTOR KNOWS YOUR INDUSTRY

Write for *certified job studies* covering your industry. Write: TOWMOTOR CORPORATION, Div. 16, 1226 E. 152nd St., Cleveland 10, Ohio. Representatives in all Principal Cities in U. S. and Canada.

TOWMOTOR
THE ONE-MAN-GANG

FORK LIFT TRUCKS and TRACTORS

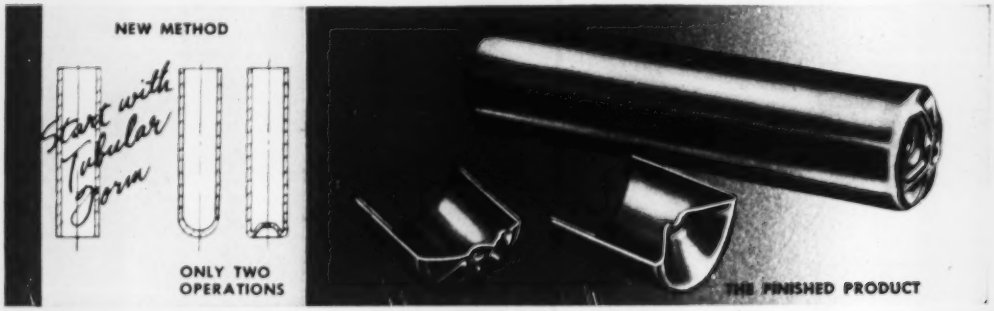
RECEIVING • PROCESSING
STORAGE • DISTRIBUTION

HOW MANY PEOPLE HAVE YOU TALKED TO ABOUT **AMERICANISM** TODAY?

Draw the line on the OLD PRACTICE

The Old Method required eight draws with various annealing and cleaning operations between to produce the part shown below.

Now You Can do it a Simpler, Faster Way



By the New Method all the draws are eliminated since the part is a tubular form to start with (it begins as a section of Wolverine seamless copper tube). The ends are closed by the Wolverine Spun End Process*, then formed on a punch press.

THE SAVINGS in TIME and MONEY

- *Fewer operations are involved*
- *Machine time is reduced*
- *Tool cost is lowered*
- *Resulting scrap is negligible*

These are factors of real concern today.

MAKING A TUBULAR PRODUCT?

Would you like to make it faster? At less cost? With a minimum of scrap? In an improved design that will function more efficiently?

CONSULT OUR CUSTOMER ENGINEERING SERVICE

Our extensive experience may supply the answer to some or all of these questions.

*A patented process Re. 22465

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Calumet & Hecla Consolidated Copper Co.
INCORPORATED
Manufacturers of seamless, nonferrous tubing
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PLANTS IN DETROIT, MICHIGAN AND DECATUR, ALABAMA
Sales Offices in Principal Cities

Export Department, 15 E. 40th St., New York 16, N. Y.

Toughened
FOR EXTRA WEAR...POSITIVE POWER
EXCLUSIVE ATLAS TOUGHENING PROCESS GIVES EXTRA STRENGTH FOR RUGGED SERVICE
On power transmission drives throughout industry, Atlas "Super Life" Roller Chain is giving extra wear . . . delivering efficient, positive power. Atlas Chain is heat-treated by an exclusive hardening process, which builds in greater strength and wear resistance than conventional hardening. Built to take a beating, Atlas gives long life, maximum service under severest operating conditions.
On all types of machine drives, Atlas Chain transmits power smoothly and efficiently. Positive "no slip" sprocket grip makes possible delivery of full rated horsepower without slippage or friction.
For extra wear . . . positive power . . . long trouble-free service, install Atlas on your drives. Write today for new roller chain fact book No. ARC-52S.
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Striking Campaign in

The Saturday Evening

POST

continued for 1952 . . . users of Phillips Cross-Recessed-Head Screws reap the benefit

Once again readers of The SATURDAY EVENING POST are being told to look for the clue to quality: Phillips Cross-Recessed-Head Screws. Take advantage of this powerful promotion by assembling your products with these quickly identified fasteners. You save time, work, money because Phillips Screws . . . Wood, Machine, Tapping or "Sems" . . . start faster, eliminate driver skids, damaged parts, split screw heads. What's more, they add structural strength. Be sure to include the clue to quality in your specifications!

PERFECTLY MATED! Only Phillips Drivers are perfectly mated to Phillips Screws. Look for the name Phillips on the shank.

✕ *marks the spot . . . the mark of extra quality*

PHILLIPS *Cross-Recessed-Head* **SCREWS**

manufactured by

AMERICAN SCREW CO. • ATLANTIC SCREW WORKS, INC.
THE BLAKE & JOHNSON CO. • CAMCAR SCREW & MFG. CORP.
CENTRAL SCREW CO. • CONTINENTAL SCREW CO. • THE EAGLE LOCK CO.
ELCO TOOL AND SCREW CORP. • GREAT LAKES SCREW CORP.
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NATIONAL LOCK CO. • NATIONAL SCREW & MFG. CO.
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THE FASTENERS OF TODAY . . . AND OF THE FUTURE

Production Pointers from GISHOLT

TIME-SAVING IDEAS

Presented as a service to machine shops, we hope some of these interesting ideas, culled from thousands of jobs, will suggest ways to help you cut time and costs in your own metal work.

HOW TO DO SPHERICAL BORING WITH SPEED AND ACCURACY

Simplimatic Solves Problem with Special Pivoted Tool Slide

Generating a radius holds few problems when you give the job to the Simplimatic Automatic Lathe. Here's a case where 7 body styles and nearly 30 different sizes of housings and journals are handled on this one machine.

Planning for such a wide variety of parts calls for the use of three tooling slides.

Front Slide is cam operated and used for turning. This work is usually completed and slide retracted before boring begins.

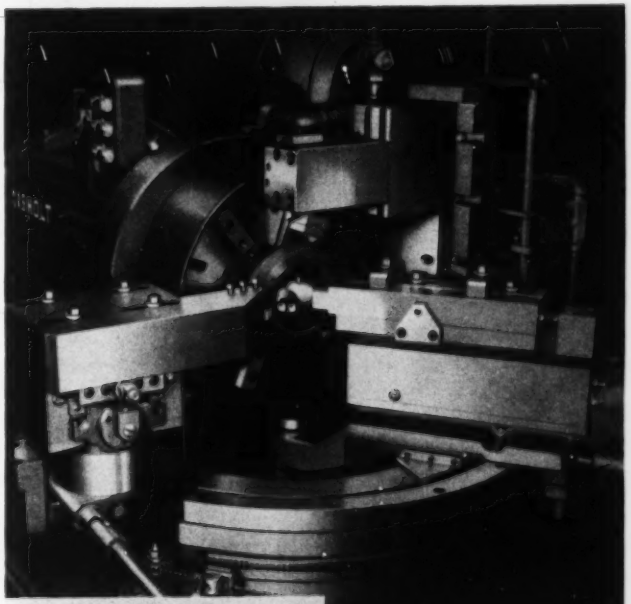
The Overhead Slide is hydraulically operated and handles facing and chamfering for both the body and the hub.

The Center Slide is used for all types of boring. This slide is mechanically driven and may be locked to provide straight or taper boring. When spherical boring is required, the slide base is pivoted and swings in an arc to generate the radius. The replaceable ball-head tool holder carries both rough and finishing tools which hold the radius to .0005" without further finishing.

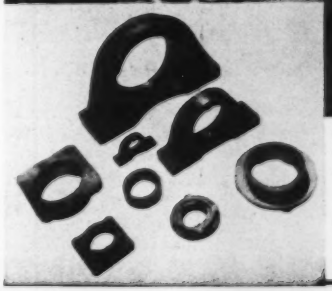
As can be seen from the sample parts, the machine cycle can be quickly varied to suit the job. Once the machine is set up, the operator is needed only for unloading, loading and starting.

Floor to floor time varies with the different parts and sizes. But, an example of the high production output of this Simplimatic is the large cylindrical housings with a 7" spherical bore. These require only 3.9 minutes.

Special pivoted boring slide handles rough and finish cuts to generate radius while front and overhead slides turn and face other surfaces in single automatic cycle.



Close-up of the Simplimatic with pivoting center slide for spherical boring of journals and housings.



A few of the varied parts handled on this one machine.

FOR MORE PRODUCTION FROM

RIGIDITY PAYS OFF ON JOBS LIKE THESE

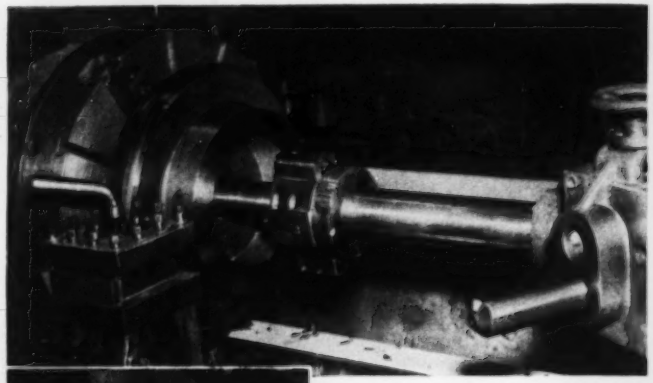
Turret Lathe Removes 300 lbs. of Metal from Solid Forging in 50 Minutes

These large parts are delivered to the turret lathe as solid steel Hyten B-4 forgings measuring 25 inches in diameter and 7 inches thick. Fifty minutes later they are finished spindle gear blanks—down in weight from 569 lbs. to 269 lbs.

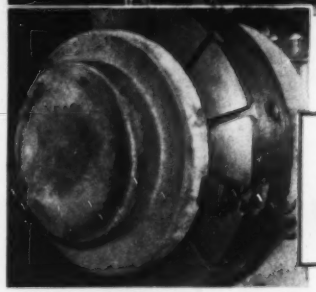
The job is duck soup for the 4L Saddle Type Turret Lathe with its 30 h.p. motor and great rigidity. A 3-jaw scroll chuck holds the part on the O.D. While the hexagon turret is pushing through the 4" drill, the two outside diameters are being turned from the square turret.

Four staggered cutters on a piloted cathead then complete the boring while the O.D. is faced and chamfered from the square turret. Finally, the I.D. is chamfered by a slide tool on the hexagon turret.

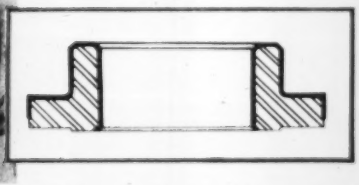
Steady production with such heavy cuts would not be possible but for the Gisholt's generous power and rugged, rigid design.



A picture of heft—it's in the large, heavy workpiece and the 4L Turret Lathe doing the job.



The rough Hyten B-4 forging chucked and ready for hogging off 300 lbs. of metal.



The heavy lines show machining operations in finishing large spindle gear blanks.

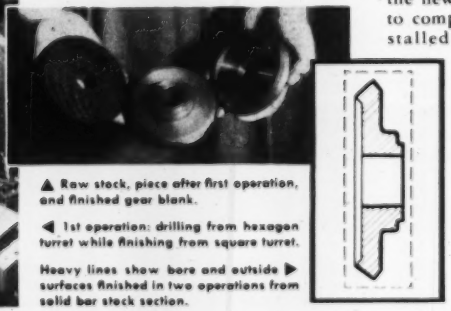
TURRET LATHE FOR SMALL LOTS ON GEAR BLANKS

Single Setup Holds Tools for Both Operations

The No. 4 Ram Type Turret Lathe is used for these bevel gear blanks. The parts are made from Hyten B-4 bar stock sections.

The first operation consists merely of finishing the bore, turning the pitch angle and hub, along with facing and chamfering. The parts are held in a 3-jaw scroll chuck, and the entire lot is run through the first operation.

To get ready for the second operation, it is only necessary to bore out soft chuck jaws to hold the part on the newly machined hub. The tools to complete the job are already installed on both the hexagon and square turrets. It is now only necessary to form the counter bore and the front bevel. Floor-to-floor time for *both* operations is less than 8 minutes.



▲ Raw stock, piece after first operation, and finished gear blank.

◀ 1st operation: drilling from hexagon turret while finishing from square turret.

Heavy lines show bore and outside ▶ surfaces finished in two operations from solid bar stock section.

Single setup of turret lathe tools handles two operations on gear blank.

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TIME-SAVING IDEAS

HIGH PRODUCTION SET-UP FOR DIFFICULT JET ENGINE PART

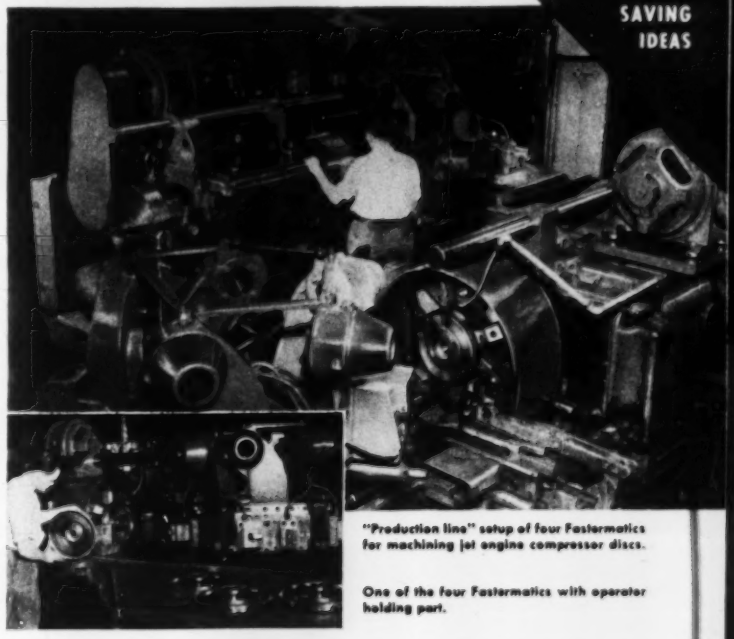
"Production Line" Method Calls for Four Fastermatics

This Compressor Disc is for the J-34 turbo-jet engine. Everything about it is tough from a machining standpoint.

(1) It has a rather complicated shape. (2) Close tolerances must be maintained. (3) The material is stainless steel.

Here's the way production is set up: Four 4F Fastermatic Automatic Turret Lathes, arranged in convenient pairs for tending by two operators, perform all machining in four pass-along operations. These operations, and the time the job takes, are classified information—but it's no secret that Fastermatic Automatic Turret Lathes have the ability to hold close tolerances on the toughest work. And, because of the automatic operation of these machines, they multiply man power.

High-speed precision machining is achieved on difficult parts with successive operations handled on 4 Fastermatics. The flexibility of the Fastermatic assures ideal feed and speed for each cut.



"Production line" setup of four Fastermatics for machining jet engine compressor discs.

One of the four Fastermatics with operator holding part.

AUTOMATIC LATHE TOOLED TO MACHINE BOTH ENDS OF AXLES

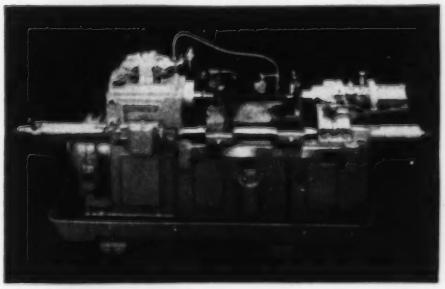
All Machining Operations on No. 12 Hydraulic in One Chucking

In order to machine both ends of these automobile rear axle shafts in one chucking, this Gisholt No. 12 Hydraulic Automatic Lathe is equipped with two front carriages and two rear cross slides—a set for each end.

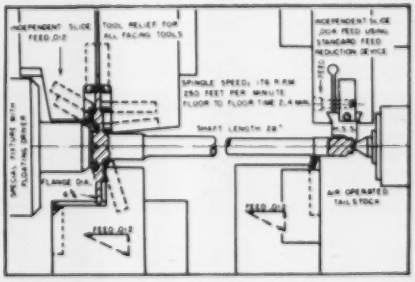
Machining begins with tools on the left front carriage turning the bearing diameter on the flange end. At the same time tools on the right front carriage turn the small diameter. Tools on the right rear slide then form the small end. Completing the job, tools on the left rear slide straddle the face and chamfer the flange.

The two carriages and slides show the adaptability of the No. 12 Hydraulic and the flexibility of its simple hydraulic circuit. Floor-to-floor time for the axle shafts is 2.4 minutes. Several types of axles are handled by the machine.

The addition of a front carriage and a rear slide to handle operations at both ends in one chucking, illustrates the ability of this versatile hydraulic machine to meet many unusual job requirements.



The No. 12 Hydraulic with special tooling for this axle job.


INDEPENDENT SLIDE FEED DIR
TOOL RELIEF FOR ALL FACING TOOLS
INDEPENDENT SLIDE DIA FEED USING STANDARD FEED REDUCTION DEVICE
SPINDLE SPEED: 170 R.P.M.
250 FEET PER MINUTE
FLOOR TO FLOOR TIME 2.4 MIN.
SHAFT LENGTH 28"
SPECIAL FIXTURE WITH FLOATING DRIVER
FLANGE DIA.
FEED DIR
AIR OPERATED TAILSTOCK
FEED DIR

Tool setup on No. 12 Hydraulic with extra front carriage and rear slide.

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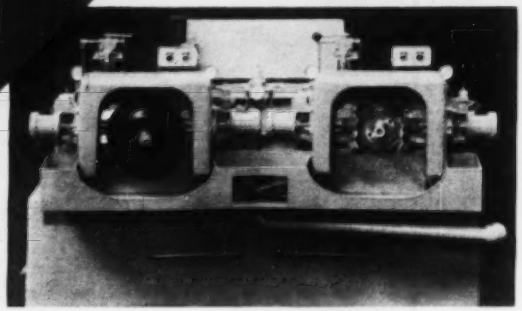
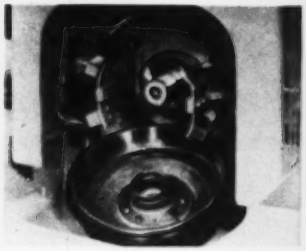
TIME-SAVING IDEAS

THESE BETTER BRAKE DRUMS COST LESS



This two-spindle Superfinisher turns out better brake drums at 5 a minute.



This close-up shows the two stoneholder assemblies which move horizontally. Drum oscillates as it rotates.

Three-Way Saving Through Superfinishing

Here's another manufacturer who has learned Superfinishing not only helps make a better product, but that it can cut costs as well.

Superfinishing these automobile brake drums is both fast and economical. Moreover, the resultant fine finish provides a superior braking surface because the area contact of the superfinishing stones removes the ridges left in turning—leaving a flat, uniformly smooth, better braking surface.

In operation, the two roughing stones (at right in close-up photo) make first contact with the rotating and oscillating drums for about 6 seconds. The finishing stones then work with the roughing stones for another 5 seconds. Finally, the roughing stones withdraw, and the finishing stones clean up the work for 6 seconds. The turned drums have a surface roughness of 150 micro inches RMS before Superfinishing. Afterward, surfaces measure 20 micro inches RMS. Production on this 2-spindle machine is five finished drums per minute.

With this Superfinisher, which has two spindles instead of one, there is also a saving in floor space. This arrangement more than doubles production because of the convenience and ease of loading and unloading.

Actually, this user benefits from superfinishing in 3 ways: (1) Cuts costs, (2) Achieves a better braking surface, (3) Saves floor space.

THE MODERN WAY TO MEASURE AND CORRECT UNBALANCE

Job Done on One Machine

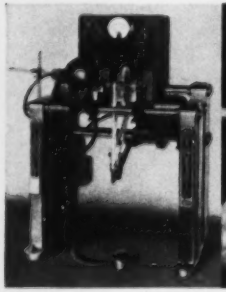
The balancing of rotating parts today follows a definite new trend: that of using a single machine for locating, measuring *and correcting* unbalance. Here's how it's done on fan motors and shafts by a simple, inexpensive set-up on a standard 1S Static Balancer.

The part is mounted in a supporting fixture which is free to vibrate in a horizontal frame. The part is then rotated, and unbalance readings are noted. Rotation is halted, and the part is turned to the proper angle for correction. A standard electric drill, mounted on the balancer support rods, is fed manually to drill to the proper correction depth as indicated by the meter reading and gauged by the drill depth indicator. A backing unit mounted to the left of the workpiece takes up drill thrust.

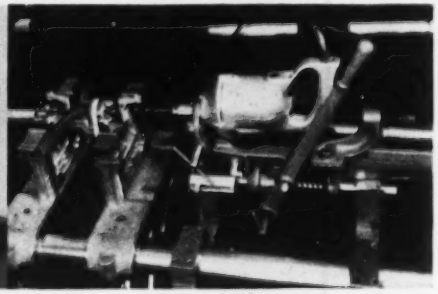
The part may now be rechecked to be sure proper correction has been made—without moving it to another machine or working station.

Write for copy of "Static and Dynamic Balancing," having latest information on balancing.

With correction equipment as part of the machine, operator can balance, correct and re-check each piece without removing it from its mounting. This reduces handling and speeds production.



The Standard 1S Balancing Machine.



A Standard 1S Static Balancer with drill for correcting small fan rotors and shafts.

Complete Courses in Balancing

As the world's largest builder of industrial balancing equipment, Gisholt conducts a complete school of balancing with courses in the theory and practical application of balancing to help with your problems. Here is training that is obtainable nowhere else. Write for details and starting dates.

No. 252
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The Gisholt Round Table represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

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Write for your copy of Gisholt's new general catalog.

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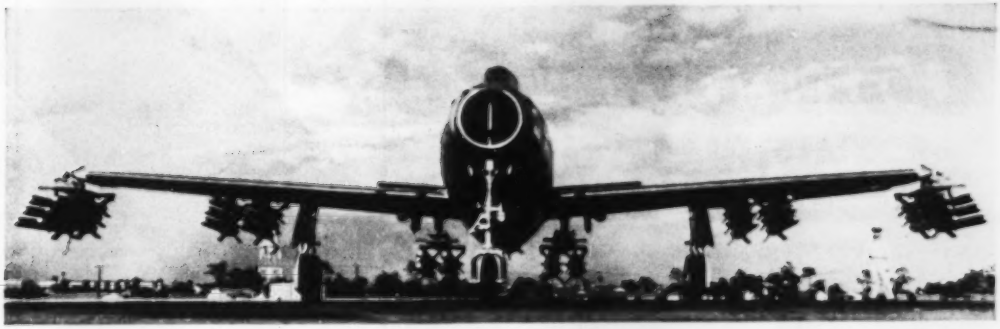

Free-Machining ENDURO Flies with the Thunderjets

Parker AN fittings, manufactured of Type 316 ENDURO Stainless Steel by Parker Appliance Company, Cleveland, Ohio, fly with Republic Thunderjets and with many other aircraft.

Machined fittings for aircraft hydraulic control systems must, above all, be strong and tough. They must contain pressures as high as 3000 psi and possess high safety margins. They must fight off all attacks of corrosion and fatigue. They must resist the effects of sudden changes in temperature and atmospheric pressure.

The material to provide all these qualities, yet be economical to forge and to machine? It's ENDURO Stainless Steel, available in free-machining grades, either hot rolled or cold drawn bars.

ENDURO responds uniformly to forging—and, as these fittings indicate, is readily machinable.

ENDURO Cold Finished Bars are processed by Republic's Union Drawn Steel Division to provide close tolerances, accuracy of section, uniform soundness and fine surface finish. Two grades are approximately 90% as machinable as Bessemer screw stock.

To help you use ENDURO to cut costs and speed production of stainless steel bar parts, Republic offers you prompt, competent metallurgical assistance. Just write:

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Concord #20 Steam Hose

FLEXIBLE

Tough

Dependable

Illustration shows how special built-in lining of stainless steel inner wire braid assures long life under the most severe operating conditions.
Pat. applied for

BWH Concord #20 Steam Hose has a protective built-in lining of stainless steel wire braid that guards against tube swelling . . . assures dependable, long-lived service.

This rugged, braided inner lining assures maximum steam flow . . . permits easy recoupling in the field.

Other Concord #20 construction features: two or three braids of alternate high tensile steel wire and rubber layers firmly bonded over outside of tube. These provide maximum burst-protection and safety. An asbestos braid provides positive cover adhesion and acts as cover insulator. A durable, abrasion-resistant cover withstands severest abuse.

Put Concord #20 Steam Hose to work for *you — now!*

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This keen awareness of a definite responsibility to fill all orders accurately and promptly has resulted in a constantly increasing number of manufacturers who look to Central Steel for their material requirements.

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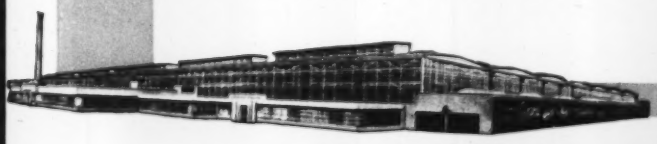

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UNLOADING VIRGO-CLEANED CASTINGS from continuous cleaning line.

HERE ARE THE BENEFITS!

- **Longer machine tool life.**
- **All surface defects show up.**
- **A cleaner, better product.**

With Virgo Molten Cleaner your castings are completely free from sand and graphite before they are machined, giving you greater machine tool life. Any surface defects on castings are shown up, and you can scrap defective castings before they are machined. This same freedom from impurities insures trouble-free operation for your product when it is placed in use.

The process is simple and easy to operate—does not require close supervision. A five-minute immersion of castings in Virgo Molten Cleaner bath at 800° F. is usually enough to dissolve every trace of sand, and dissolve graphite to satisfactory depth. A water quench removes salt and leaves a protective coating on the castings. (This coating is corrosion-resistant and may be left on if castings are to be stored.) The coating is removed by a three-minute dip in dilute acid. A brief water hosing or rinse completes the job.

You can use the Virgo bath, at higher temperature, to stress relieve while desanding. By combining operations in this way, costly annealing equipment, as well as the additional operation can be eliminated.

For full details and description of this process, write us today. Please use your business letterhead or coupon below.

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Producers and fabricators of stainless and alloy steels use Virgo Descaling Salt to quickly remove scale produced by hot rolling, forging, extruding, casting, annealing. The Hooker Process is backed by 15 years' experience in salt bath descaling and cleaning. Engineering, research and on-site operating assistance are part of our service.

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They tell the whole story on Virgo Descaling Salt and Virgo Molten Cleaner—what they are, how they work, their advantages, equipment involved, and the Hooker services you enjoy as a user of the process.

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ELECTROMET Data Sheet

A Digest of the Production, Properties, and Uses of Steels and Other Metals

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How VANADIUM improves engineering steels and helps conserve critical alloys

In these critical times when many alloying materials are scarce, you may be able to use vanadium to good advantage. Steels alloyed with vanadium meet most of the mechanical specifications for low-alloy engineering and structural steels. In fact, vanadium can often be used in engineering steels to replace at least part, if not all, of certain alloys now in critical supply.

The metallurgy of vanadium is well known. Small additions of vanadium—0.10 to 0.30 per cent—can be used effectively to give steel extra strength, toughness, and resistance to fatigue and wear. It improves engineering steels by increasing their yield strength without sacrificing ductility. The uniformly fine grain size of vanadium-bearing steels makes them tough and resistant to abrasion, fatigue, and impact.

Better Mechanical Properties

In the following table are typical analyses for carbon-vanadium and chromium-vanadium steels that are suitable for most applications where low-alloy, high strength steels are required. The carbon-vanadium steel is compared with plain-carbon steel; and the chromium-vanadium steel, with chromium-molybdenum steel. Note the excellent properties of the vanadium-bearing steels.

Fig. 1 — Vanadium increases the strength, toughness, and wear resistance of engineering steels for many machine parts, such as this large crankshaft.

Improves Cast Iron

A small addition of vanadium, usually from 0.10 to 0.25 per cent, refines the grain of cast iron, and materially increases its strength and hardness. Moreover, vanadium may be used in cast iron to replace at least part, if not all, of certain alloys that are now in short supply.

Vanadium in Rimmed Steel

An addition of approximately 1 lb. of vanadium per ton of steel produces non-aging characteristics in a rimmed steel. These non-aging properties, together with improved deep-drawing characteristics and the good surface inherent in rimmed steels, make these steels of particular interest at the present time.

Grades of Ferrovanadium

ELECTROMET produces ferrovanadium containing 50 to 55 per cent vanadium for the production of vanadium-bearing steels and irons. The alloy is produced in three grades with maximum 0.20, 0.50, or 3.00 per cent carbon and maximum 1.50, 2.00, and 8.00 per cent silicon, respectively. Each grade is specially adapted to fill the different requirements of iron- and steel-making.

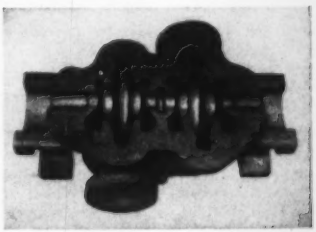

Fig. 2—Steel and iron castings treated with small additions of vanadium have high ductility and greater toughness and impact resistance.

Write for a copy of the booklet, "ELECTROMET Products and Service," which gives helpful information about the use of ferrovanadium and other alloying metals that ELECTROMET supplies. The booklet may be obtained from any ELECTROMET office: in Birmingham, Chicago, Cleveland, Detroit, Los Angeles, New York, Pittsburgh, or San Francisco. In Canada: Welland, Ontario.

Properties of Vanadium Steels Compared With Other Engineering Steels

Typical Analysis, %	Carbon Steel	Carbon-Vanadium Steel	Chromium-Molybdenum Steel	Chromium-Vanadium Steel
Vanadium	—	0.16	—	0.16
Carbon	0.50	0.49	0.50	0.50
Manganese	0.71	0.77	0.80	0.79
Silicon	0.19	0.15	0.30	0.31
Chromium	—	—	0.95	0.98
Molybdenum	—	—	0.20	—
Annealed and Furnace-Cooled				
Tensile Strength, psi	90,600	100,000	100,000	99,500
Yield Point, psi	48,900	66,000	50,000	64,100
Elongation in 2 in., %	23.3	25.0	23.0	28.4
Reduction of Area, %	37.8	49.1	45.0	59.0
Izod Impact, ft.-lb.	13.5	26.0	17.0	44.0
Quenched and Tempered				
Tensile Strength, psi	134,900	134,500	232,000	232,800
Yield Point, psi	110,800	128,000	214,500	224,200
Elongation in 2 in., %	18.3	18.3	10.0	10.4
Reduction of Area, %	54.1	56.6	39.0	43.1
Izod Impact, ft.-lb.	54.0	65.0	12.0	12.0

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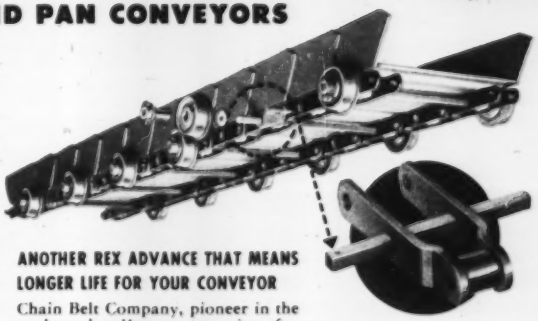
IS EASY WITH REX® APRON AND PAN CONVEYORS

When it comes to transporting hot bulk materials, there is virtually no upper limit to the temperatures the rugged, heavy-duty Rex Apron and Pan Conveyors can stand. Several now in operation are handling material up to 1900° F. Hot sinter, hot clinkers, hot lime, hot castings—these and many other "hot" items are all in a day's work with Rex Apron and Pan Conveyors.

Rex Conveyors will handle jobs where other types such as shaker conveyors and steel belts are useless. They have high capacity, require very little maintenance and operate at very low cost. Wearing parts are specially hardened. Chain is located away from high heat zone. Graphite impregnated grease is used throughout. When heat softens grease so that it flows, graphite remains to do lubricating job. With Rex, you are free from worry about premature failure and consequent costly down time or repairs.

For all the details write to Chain Belt Company, 4660 W. Greenfield Ave., Milwaukee 1, Wis.



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Ryerson Adds Steel-Service Plants at Seattle and Spokane

We are pleased to tell you that we have extended our steel service to the great Northwest through purchase of the stocks and facilities of the Seattle Steel Co. of Seattle and the Inland Empire Steel Co. of Spokane.

These associated companies are leading distributors of carbon, alloy and stainless steel in their areas. They also supply reinforcing bars and carry stocks of aluminum, copper and brass. Under the able direction of Clyde Summerville, president, William Case, Seattle sales manager and Roy Bialkowsky, manager at Spokane, they have served the Northwest for many years.

Recently, Mr. Summerville, the principal owner, found it necessary to lighten his work load and invited us to come in. But, fortunately, these experienced men together with most of their staff are carrying on with us to assure a continuity of good service. Ray Lockwood, former Ryerson railroad sales manager who has more recently been concerned with government regulations, is now the assistant manager at Seattle.

Both plants will continue to carry a wide range of products, and stocks as well as facilities will be expanded when and where possible. This move adds the 14th and 15th plants to the Ryerson steel-service group serving steel users across the nation. We trust that our service in the Northwest will merit the continued good will of the region's steel users.

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STEEL

The Metalworking Outlook

February 4, 1952

Respite from Price Boost

A steel price increase is less imminent than it was a week ago (p. 60). This delay threatens to complicate solution of the steel wage dispute. The steel industry insists that any wage increase must be accompanied by a steel price increase. Government price fixers talked about providing price relief under the Capehart amendment to the Defense Production Act. But up jumped the amendment's author, Sen. Homer E. Capehart. He threatens to seek repeal of the amendment if the amendment's formula is used to give a steel price increase to offset a steel wage raise. Says Senator Capehart: The amendment is only to take care of cost increases incurred before last July 26. Even if Senator Capehart hadn't thrown in this monkey wrench, it would have taken a month, say government price fixers, to work out an equitable schedule of prices. Further study of the pricing problem will be made next Thursday when the General Steel Products Industry Advisory Committee meets with OPS officials in Washington.

Ironic

Irony of demand for an increase in steelworkers' wages is that it comes at a time when steel demand is slackening, a slackening that could result in reduced employment in the steel industry. The slackening is inevitable. Steel inventories have once again returned to a position of adequacy, Bennett S. Chapple Jr., assistant executive vice president, United States Steel Co., told steel warehousemen at Chicago. Further, he expressed concern that steel inventories will rise soon above an adequate level. "When this happens, steel consumption either will have to increase, or production must be cut back."

Hope for the Future

Don't look for any great relaxation of materials controls before '53. But, by that time the defense program should be largely complete, government stockpiles high and civilian production at least equal to pre-Korean levels, says Henry H. Fowler, NPA administrator. Removed from under the Controlled Materials Plan in the last month were chrome stainless steel, glass containers, synthetic rubber, plastic-type nylon, methyl chloride and bismuth. Inventory restrictions still apply in each case.

Year of Unrest

Labor unrest will continue throughout the year as atmosphere of the coal and steel talks spreads throughout industry. A rash of walkouts, wildcat strikes and grievance demands serves to throw management off balance and disrupt tight production schedules. Settlement of

Production-Engineering News—p. 87 The Market Outlook—p. 181

coal and steel negotiations will be a signal for widespread wage agitation.

Tempering Factor

A tempering factor in some unions' actions may be the increasing number of layoffs in civilian goods plants—and not only in Detroit. If a company can't schedule full production, there's little the union can do but complain to the government. Its complaints will register in election-minded Washington, too. Unless sizable defense work can be lined up to prevent wholesale unemployment, materials relief likely will be forthcoming.

Matter of Expediting

One move under consideration by NPA to smooth the flow of machine tools to users: An order requiring dealers of used machines and new imported machines to file inventories with NPA and freeze machines in dealers' shops for inspection by prospective purchasers. Another idea in effect now is a tool search abroad, and not only in Europe. A three-man NPA mission is in Japan to scout needed equipment. If the search is successful, NPA will direct users to Japanese sources of supply.

More Nonferrous Metals

Expansion programs in nonferrous metals will give you more aluminum, magnesium and zinc in the next few years. Present aluminum output should just about double by 1953; goal for magnesium in 1953 is 131,500 tons of domestic ingot production; zinc's goal by 1955 is 1,320,000 tons.

The Burden We Share

It's no wonder you're round shouldered, if you are. The per capita federal tax burden has grown from $3.38 in the "pre-income tax" year, 1912, to $326.82 in 1951 for every man, woman and child in the country, says the Commerce Clearing House. The World War II peak was reached in 1945 with a per capita tax of $312.86.

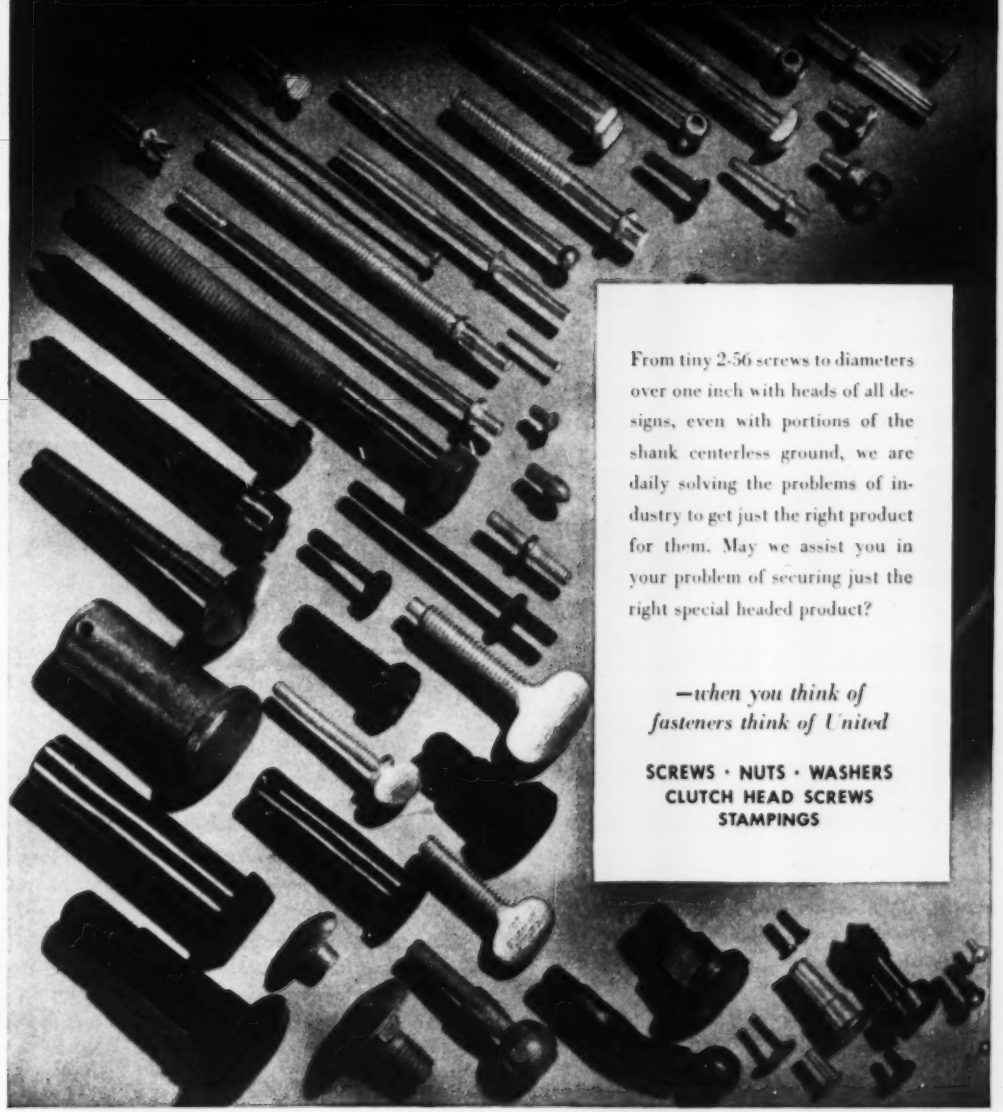
Straws in the Wind

A $56 million loan to Central Iron & Steel Co. is under consideration by DPA . . . Included in the Navy Ordnance Bureau's most-wanted list are heat treating furnaces, especially the large continuous type used for cartridge cases and projectiles . . . New industrial plant construction this year will jump to $3.75 billion, nearly $1 billion more than in 1951, says the Bureau of Labor Statistics . . . Oil country tubular goods made from conversion steel won't be counted as part of total second-quarter allotments, says PAD . . . The Navy is building a $16 million ammunition depot at Hastings, Nebr.

Here and There in Industry

More fixing and remodeling of homes, less new building next year (p. 61) . . . Bessemer steel production capacity is the only one to show a dip for last year (p. 62) . . . NPA is probing means of helping small businesses hit by drastic materials cutbacks (p. 63) . . . Production of J-47 jet engines will be "phased in" with piston engine schedules (p. 64) . . . Shifting of defense schedules may be the reason for lull in industrial production (p. 77).

UNITED
SPECIAL HEADED PRODUCT



From tiny 2-56 screws to diameters over one inch with heads of all designs, even with portions of the shank centerless ground, we are daily solving the problems of industry to get just the right product for them. May we assist you in your problem of securing just the right special headed product?

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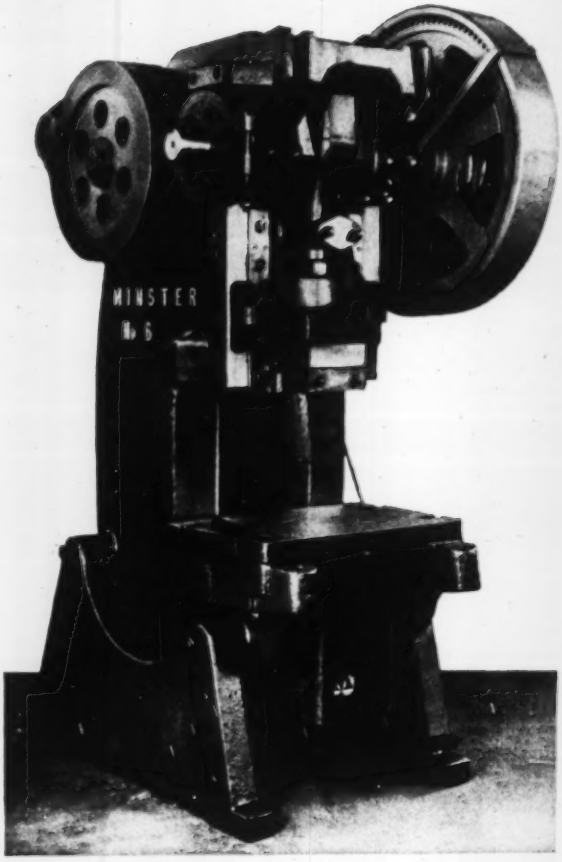


Nickel alloyed castings and forgings are used for vital components in the Minster line of mechanical power presses . . . which range from 12 tons to 1500 tons capacity.

THIS OPEN BACK inclinable press cuts handling costs. Not only can it deliver 60-ton pressure at the bottom of the stroke, but it permits a wide range of feed direction, parts ejection and scrap handling.

Moreover . . . to improve its performance and service life . . . the builder, The Minster Machine Company of Minster, Ohio, utilizes high strength nickel cast iron frames, nickel bronze bearings and forged nickel steel clutch parts.

Main frame and all component castings are produced in Minster's own foundry, from high tensile nickel alloy iron containing 0.90 to 1.75% nickel, depending upon use.

Ellwood City Forge Company of Ellwood City, Pa., forged all clutch throwout and striking parts from heat treated Type 2350 (3½% nickel) steel. This high carbon nickel steel provides stamina to withstand the high stress which occurs when the crankshaft accelerates from "idle" to "full speed" within a fraction of a second.

All bushing for crankshaft bearings, and for lower connection bearings are of 1½% nickel bronze . . . cast by Ryder Brass Foundry of Bucyrus, Ohio.

At the present time, the bulk of the nickel produced is being diverted to defense. Through application to the appropriate authorities, nickel is obtainable for the production of engineering alloys for many end uses in defense and defense supporting industries.

EMBLEM OF INCO SERVICE

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N. Y.

Higher Volume, Lower Profit

Annual earnings statements for 1951 now being released by numerous metalworking companies conform to three patterns. Under No. 1 are a few companies whose sales broke all previous records and whose net profit after taxes registered new highs. Under No. 2 are companies catering to peacetime markets which suffered cutbacks in sales sufficiently severe to cause the companies to shift from gratifying profits in 1950 to disconcerting deficits in 1951. Under pattern No. 3 are corporations, of which United States Steel is typical, which enjoyed sales far beyond anything previously experienced, but recorded net profits after taxes substantially less than those of years when volume of sales was considerably lower.

The large number of corporations which report sharp reductions in profit or deficits assumes importance when one applies their significance to President Truman's budget message. Overlooked by many observers was the fact that the President expects that tax revenues from corporations will increase more than receipts from other sources.

According to his expectation, taxes from individuals will increase from $30.1 billion in fiscal 1952 to $33 billion in fiscal 1953, or 9.6 per cent. He figures that revenue from corporations will increase from $22.9 to $27.8 billion, or 21.4 per cent. At the same time he was estimating this transfer of a larger share of the tax burden onto the shoulders of corporations, he was advocating more support for farmers and more benefits for employees and was suggesting that corporations should absorb a substantial portion of increased costs by refraining from raising prices.

Disappointingly low corporation profits on fantastically high volume as revealed in many current annual earnings statements not only put a definite chill on the President's expectations but they also deflate the arguments of union chieftains that employers can pay hefty wage increases and costly fringe benefits out of their "exorbitant" profits.

If national policy is to "milk" industry to the extent that it can earn only a modest profit when it is operating at virtually 100 per cent of capacity, what is to happen when its plants are operating at 75 or 80 per cent of capacity, or less?

E. C. Shaner

EDITOR-IN-CHIEF

JUST WHAT IS NEEDED? Suspension by the government of the $69 million contract held by Fisher Body Division of General Motors for building 757 vertical lathes for the Bullard Co. threatens to focus the spotlight upon the off-again-on-again characteristics of certain phases of the defense program. Official explanations of the suspension hint that "revision of

Air Force production schedules" had something to do with it. "Changes in operations, techniques and possible design changes have altered the whole machine tool picture. The supply of Bullards already may be sufficient."

Such explanations are certain to arouse doubts in the minds of all who hold defense contracts. Does anybody in Washington know what we really need or is this just a simple case of a major change in plan? A reassuring answer from somebody who knows would help tremendously at this stage. —p. 59

* * *

SALUTE TO CANADA! By pursuing fiscal policies that are sound in comparison with those of the United States, Canada is enjoying the thrill of knowing that the value of her dollar has risen above that of her southern neighbor. The confidence that comes from a strong government currency probably will cause Canada to take more positive steps in improving her economic position.

She is showing increasing impatience with United States delay on the St. Lawrence Waterway project and she is considering important changes in export policies in regard to raw materials. For instance, she may insist that more of her natural resources be refined before they are shipped out of the country. This would provide more work for the Dominion and increase the revenue from exports by a substantial margin. —p. 65

* * *

ALUMINUM'S MARKETS: Under the pressure of the defense program, the aluminum industry is expanding by leaps and bounds. Today the three producers of primary aluminum have an annual capacity of just under 1700 million pounds. Expansion by these three and by a fourth producer in 1952 and 1953 will lift annual capacity to more than 3000 million pounds.

These four—Aluminum Co. of America, Reynolds Metals Co., Kaiser Aluminum & Chemical Corp. and Anaconda Copper Mining Co. associated with Harvey Machine Co.—are intensely interested in developing new markets for aluminum that will absorb the output of the greatly expanded capacity when the military demand tapers off. Strangely enough some of the most promising market opportunities seem to be those in which aluminum will compete with nonferrous metals, rather than with the conventional rival steel. The electrical field is especially attractive. If you have bought electric light bulbs recently, look at the bases. Chances are that they are aluminum instead of brass. —p. 69

* * *

PLANT OF NEW IDEAS: Visitors to the recently completed plant of Lincoln Electric Co. in Euclid, O., are impressed by the numerous revolutionary ideas incorporated in its design and construction and by the marked manner in which simplicity of layout contributes to reduction of costs.

The plant is windowless. All raw materials pass from a receiving dock directly to the point of use. There is no parts storeroom, no goods-in-process inventory and no finished goods warehouse. Each point of subassembly is a self-contained small factory. Subassemblies flow smoothly to final assembly, test and inspection to shipping dock and into freight cars or trucks.

Offices are in the exact center of the plant. Employee facilities are in an underground tunnel extending the full length of the plant. No employee works more than 200 feet from his locker. The new plant permits a 50 per cent increase in output over that of the old plant with no increase in personnel, machinery or equipment. —p. 92

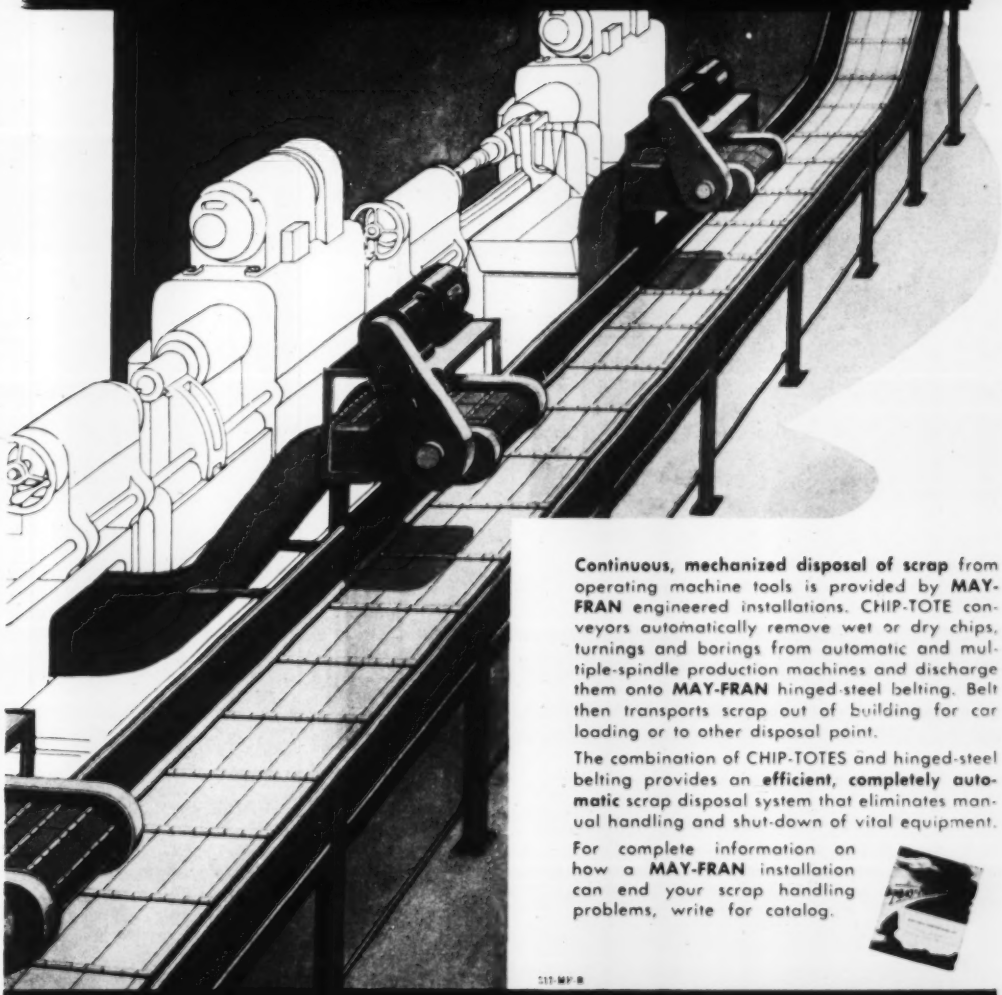
* * *

PROGRESS IN TITANIUM: Production of ductile titanium metal is gaining steadily. When the first commercial unit was placed in operation by Du Pont in 1948, its rated capacity was 100 pounds per day but actual output seldom exceeded 50 pounds. Today in a new plant at Newport, Del., Du Pont is producing 1½ tons a day. It expects to increase daily output to 2½ tons sometime this year.

Since 1948 the process of producing titanium metal has been improved. Equally important, research teams have developed an improved method of casting the sponge titanium metal into solid ingots. This involves surrounding the melting operation with an atmosphere of inert gases. Furnaces based on arc heating are producing ingots as large as 1200 pounds.

Potential uses of titanium for aircraft power plants, air frames, pyrotechnics and marine and chemical equipment are well known. Recent reports that unalloyed titanium is more resistant to projectiles than any armor plate now known open up a new field for investigation. —p. 117

MECHANIZED SCRAP HANDLING SPEEDS PRODUCTION



Continuous, mechanized disposal of scrap from operating machine tools is provided by **MAY-FRAN** engineered installations. CHIP-TOTE conveyors automatically remove wet or dry chips, turnings and borings from automatic and multiple-spindle production machines and discharge them onto **MAY-FRAN** hinged-steel belting. Belt then transports scrap out of building for car loading or to other disposal point.

The combination of CHIP-TOTES and hinged-steel belting provides an **efficient, completely automatic** scrap disposal system that eliminates manual handling and shut-down of vital equipment.

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"That's it! I'll bet that's the answer to my coating problem"

"Ted Hubbard, what *are* you talking about?" asked his wife.

"That wax paper you're tearing . . . that may be the answer to the thing that's been giving the can manufacturers all the trouble."

Ted, an Inland mill representative, had been working for some time on a very peculiar problem in the plant of a large can maker and Inland tin plate customer. In lacquering tin plate for can ends, this customer's sheets had been coming through with "eye holes" (pin-head-size spots where lacquer failed to coat). Neither Ted, nor anyone else, had been able to learn *why*.

Ted, idly watching his wife tear wax paper from a roll, remembered: *Wrapping tin plate packages in wax paper was standard practice for many steel producers, and paraffin, a mineral oil derivative, would not mix with lacquer.*

Ted had a hunch.

Next day, the problem was solved! Ted proved that when the tin plate was removed from the wax paper wrapper, microscopic wax particles adhered to the edges of the sheets. During the lacquering process, these particles were drawn up from the edges and across the sheets by suction from the lifting device . . . were picked up by the roller coaters . . . and wherever a particle lodged, lacquer failed to coat that spot on the sheet. This was the cause of the eye holes.

Tin plate producers switched to a different type of paper wrapping with the result: no more eye holes! INLAND STEEL COMPANY, 38 South Dearborn Street, Chicago 3, Illinois.

Names used are fictitious

Making Steel
Do Your Job Well
Is Inland's Job

Your Scrap is Needed by The Steel Industry for National Defense

Arms Production Policy Swerves

Suspension of machine tool order, and off-again-on-again scheduling of aircraft and shipbuilding programs shows what's vital today can be dispensed with tomorrow

WATCH for changes in the pattern of defense emphasis. If you're not alert to these changes, all your plans for the future may be thrown out of focus.

In the kaleidoscope of rearmament, what's vital today may be of secondary importance tomorrow. Look at the off-again-on-again policy in setting airplane production schedules. Note how the shipbuilding program blows hot and cold.

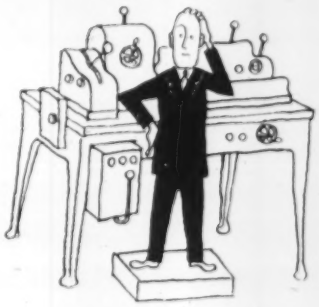
Latest case in point is suspension by the government of the $69 million subcontract that Fisher Body Division of General Motors holds from Bullard Co. for complete vertical lathes.

Hornets Nest—Aura from the tool order suspension is stirring up a hornets nest in Washington and Detroit—not to mention the numerous points where Fisher supplier companies are located. Reaction of Fisher Body was registration of complete surprise. The GM division was on the verge of producing the intricate 42-inch Cutmaster when the government's stop-order came. First tools were to be built next month, and a production rate of 50 a month relatively soon thereafter was scheduled.

Official explanations of why the 757-tool contract was held up were offered by NPA Administrator Henry H. Fowler and Swan E. Bergstrom, director of NPA's Metalworking Equipment Division.

"The tools were originally needed to step up the jet engine program. Revision of Air Force production schedules and other changes in programming had something to do with holding up the contract.

"Changes in operations, techniques and possible design changes have altered the whole machine tool picture. The supply of Bullards already may be sufficient.



We figured we had better stop and survey the program, and if what we think is true, we probably will have to cancel the Fisher contract."

Probes Coming—The Munitions Board will report Wednesday with its final decision on the contract.

What's Hard To Get

HARDEST-TO-GET machines, because of the sold-up condition of manufacturers, as seen by Navy's Bureau of Ordnance are:

Hydraulic and mechanical forming presses from 200 to 4000 tons capacity. (The principal obstacle to desired increased production is insufficient supply of hydraulic pumps and hydraulic equipment.)

Multispindle automatic screw machines, both bar and chucker types, especially in the larger sizes.

Bullard Multaumatics and Cutmasters.

Horizontal boring mills, especially larger sizes; horizontal precision boring mills for small work.

Vertical and horizontal milling machines, all sizes.

Jig borers, all sizes.

Radial drills, medium and large sizes.

Gear-cutting machinery, small precision types.

Surface grinders.

The man most obviously upset by the stop-order was Sen. Blair Moody of Michigan. His Senate subcommittee will conduct an investigation to get an answer. Replying to Senator Moody's demand, Mr. Fowler stated that Bullard had at no time exerted pressure to have the contract canceled. Fisher Body facilities will be used for some type of machine tool work, NPA promises.

Direct offshoot of the Fisher deal was speculation as to whether the machine tool shortage is as critical as has been indicated. Some of the factors that may have influenced the government include the fairly general belief that many prospective tool buyers are holding out for tools that will be the best long-term investment. Thus, it is said that the Bullard is in great demand not only because of its application to defense product manufacture but because of its flexibility. Potential users, the government believes, could get along nicely on some defense work with other tools that aren't in such short supply. NPA also is giving evidence that it realizes all plants can't be tooled up simultaneously and that preferential treatment will have to be given some companies to get them into production sooner than others.

Pool Umbrella Leaks

Machine tool builders aren't all participating in GSA's guaranteed market plan

RELATIVELY FEW machine tool builders are protected by the pool order umbrella. With backlogs running close to two years, most builders find the guarantee of a market for their production by General Services Administration of use only in special circumstances.

Latest count on pool orders shows 111 contracts (for 70,000 to 75,000 tools) with face value of $1101 million have been tendered by GSA. Of these, 79 contracts involving roughly 50,000 tools valued at $85 million have been accepted and the balance are still under negotiation. Included in these figures are pool orders for a limited num-

ber of forming and forging presses and other forging units.

Builders Aloof—Not all producers are participating in the pool program. That is shown by comparing the 111 orders tendered so far with the 300 manufacturers that GSA can deal with.

Bulk of the basic contracts have been placed, says GSA, though the bottom of the barrel of funds available for additional orders "is not yet in sight." No mushrooming of the program is seen unless there are big expansions in certain types of arms production. So far there has been a buyer for every machine tool produced. GSA guarantees it will take any surplus units in the pool—but at a discount.

Firmly Committed—The larger machine tool companies particularly find the pool order plan of limited use. They don't need GSA backing to arrange financing; backlogs are firmly committed for specific use and user.

Red tape has been cut considerably—to the extent that it no longer holds up procurement materially, builders feel. They do resent the pool plan's discount arrangements and are inclined to agree with findings of the House-Senate "watchdog" committee. That group's report may contain one good reason why pool orders aren't used more: Defense agencies lack information on future tool needs.

Loyalty Patterns—When a builder takes on a large pool order, he may do so at risk of disrupting the historical relationship between producer and consumer, as buyers can deal through GSA. They're primarily interested in two things: A certain type of tool, and how fast they can get it. As a result customer loyalty patterns can be changed considerably.

Giddings & Lewis Buys Plant

Acquisition of a new plant to house its Davis Boring Tool Division is expected to increase its production 50 per cent by midyear, say officials of Giddings & Lewis Machine Tool Co., Fond du Lac, Wis. Purchase was prompted by heavy demands upon Giddings & Lewis by the defense program.

Planners Are a Problem

Is a major problem with our present economy the mistakes of our Washington planners? L. L. Colbert, president of Chrysler Corp., thinks so.

Speaking in Detroit before the Automotive & Aviation Parts Manufacturers Inc., Mr. Colbert said, "None of us can or wants to deny that there are shortages of some of the strategic materials. But within recent weeks we have seen one shortage disappear. It floated right out of the window once the figures on government reports were disentangled and read carefully."

He was referring to the supply of chrome stainless steel.

"Lately," he added, "Washington has seemed to concede that the supply of steel in general is adequate for demand in its present cut-back state. But officials still appear reluctant to believe that a good many mills are looking for customers to take tonnage off their hands in the coming months. Or that these mills have not yet found government-approved orders to absorb their output of the types that our industry uses in the time preceding the expected build-up of military items."

Steel Price Plans Hit Snag

Solution of the steel industry's wage-price problem is up against another snag.

Government price fixers were talking about use of the Capehart amendment to the Defense Production Act to allow price increases to the steel industry to help compensate for wage boots sought by the steelworkers.

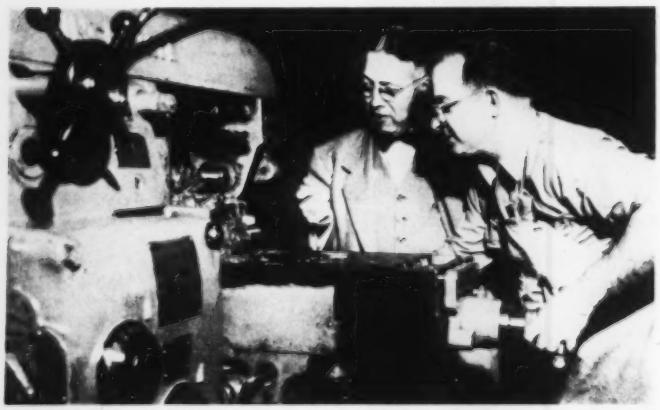
In stepped the Caperhart amendment's author, Sen. Homer E. Capehart (Rep., Ind.), who thinks his amendment should not be used to give the steel industry a price increase in conjunction with a wage increase. Says he: "If there is any tendency to use the formula to cover costs after July 26 I shall introduce a bill to repeal the amendment!"

The pricing formula in the amendment allows manufacturers to apply for higher price ceilings on their products based on their highest prices just before Korea plus increased costs up to last July 26.

How Much Is Enough?

Cal C. Chambers, president of the Malleable Founders' Society, warns that drastic cuts in automobile and truck output now may cripple the malleable castings industry through loss of production workers in any later production effort for combat vehicles or other articles of armament.

The output of the malleable industry goes chiefly to passenger car and truck makers and the curtailment has already affected the larger foundries where automotive parts are made.



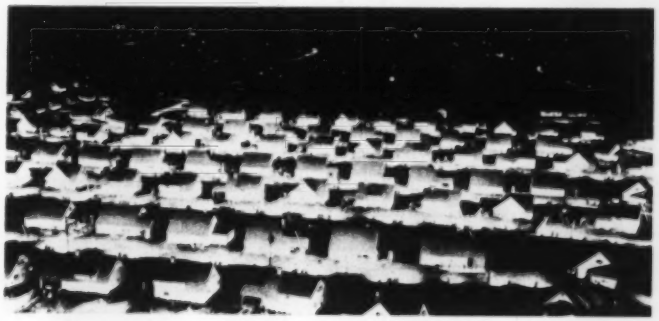
FIRST TRAINEE: Norman J. Burkard, right, is the first trainee in a three-year program underway at General Electric Co., Schenectady, N. Y. Frank T. Lewis, manager of manufacturing personnel development, and Burkard discuss operation of a horizontal milling machine, one phase of a rotating job plan to familiarize trainees with all phases of shop operation and related functions

Housing: Still High

Heavy remodeling work this year will push home building volume near 1951 levels

HOUSING construction — with all the ramifications for plumbing, appliance and other metalworking industries — promises this year to approach the high 1951 volume even though new starts can't reach the 1.1 million attained last year.

The high rate of total building will be achieved by new starts, plus record activity in remodeling in 1952 because remodeling isn't subject to as severe restrictions as is new construction. Government curbs allow enough materials for 600,000 new dwelling starts in 1952, but builders, by scrimping on existing materials and using alternates, hope to start 800,000, the government's "attainable" ceiling.



HOUSING CONSTRUCTION MAY REACH 1951 HIGH
. . . new starts will be down but remodeling will be up

The How of It—To start their 800,000 new homes and increase their remodeling this year, builders will sometimes substitute aluminum for copper and brass electrical purposes, will often use steel in nonelectrical applications. Plastic water pipe for cold water and gas lines is offered. Lumber companies already are plugging wooden gutters for metal ones. Glass, tile and plastic replacements are on the market for traditional metal bathroom fixtures. Another conservation step may be plastic for metal screens and abandonment of locks on all doors except the outside entrances.

Plumbing goods manufacturers have redesigned some of their products; one producer saved five pounds of steel on a formed-steel porcelain-enameled bathtub. Chrome plating is often being applied thinner on fixtures where it still is being used.

The Market — The demand now is for houses costing between $10,000 and $18,000. E. C. Mahoney, a Chicago builder and president of Chicago Metropolitan Home Builders Association, predicts that 80 per cent of 1952 building will be civilian and the rest defense. Most of the defense construction will be multi-unit dwellings, and in some areas, notably New England, the greatest requirements will be for apartments, but the bulk of demand is for single homes of five or six rooms.

In New England last year only about 500 apartment house contracts were placed, valued at around $40 million, compared with 1398 units at $85 million in 1950. The reason is the shortage of private capital, a factor as serious as materials shortages in plaguing builders. Both those factors this year may not mean a substantial decline in total building, but they will mean a significant change in the kind of organizations doing and financing the construction. Materials shortages will push many little builders out this year and financing shortages will tend to bring in the federal government.

GM Adds to Scrap Pile

General Motors Corporation reports more than 7,221,217 pounds of non-production scrap metal turned in by its plants, suppliers, and dealers during the past month. Added to the more than 86 million pounds GM reports collected since July 1, its total contribution reaches 93.5 million pounds, the iron-steel weight equivalent of 29,433 average weight automobiles.

Ryerson Aids Scrap Drive

In an effort to put idle equipment into use and scrap into the steel mills, Joseph T. Ryerson & Son Inc. is offering free space in the classified columns in its pictorial newspaper for firms having such equipment to sell.

By letters and advertising, Ryerson is urging steel users to make inventories of idle equipment to see if it has a possible use or if it is scrap. If it can be used, Ryerson will run a free ad in an effort to find a buyer. If the material can't be used, it should be sold for scrap.

A Losing Race

Production and sales of steel companies climb but earnings decline

HARD WORK for what?

That well could be a question in the minds of steel company executives, for the harder their companies work the less they earn. Taxes keep gnawing deeper and deeper into earnings.

United States Steel Corp. is a good example. Its 1951 sales totaled $3,524,978,527, a 19 per cent increase over 1950's $2,956,406,146, but its 1951 net income of $183,953,202 was 14 per cent less than its 1950 net income of $215,464,142.

U. S. Steel's estimated federal taxes on income were $234 million in 1950, $398 million in 1951. That's a 70 per cent incease.

Inland Steel Co. reports its 1951 sales reached a new high of $520,211,003, a 13.3 per cent increase over 1950's $459,253,586. But it too saw its net income shrink — from $38,015,676 in 1950 to $34,398,585 in 1951.

Wheeling Steel Corp.'s sales rose in 1951 to $227,075,571 from 1950's $184,802,615, but its net profit slipped from $18,314,517 in 1950 to $17,392,959 in 1951.

Steel Rate: Going Up!

Only bessemer capacity shows decrease. Industry expects 9.5 million tons more in '52

INCREASES didn't occur all along the line in steel production capacity last year. Capacity to produce bessemer steel decreased 4.3 per cent, or 240,000 net tons, the American Iron & Steel Institute reveals.

As a result of this decrease, the nation's bessemer capacity on Jan. 1, 1952, was listed as 5,381,000 net tons, compared with 5,621,000 tons on Jan. 1, 1951. The bessemer capacity has varied as much as 1.5 million tons over the last ten years. High point in that period was Jan. 1, 1942, when the bessemer capacity was listed as 6,721,400 tons, and low mark was 5,154,000 in both 1946 and 1947.

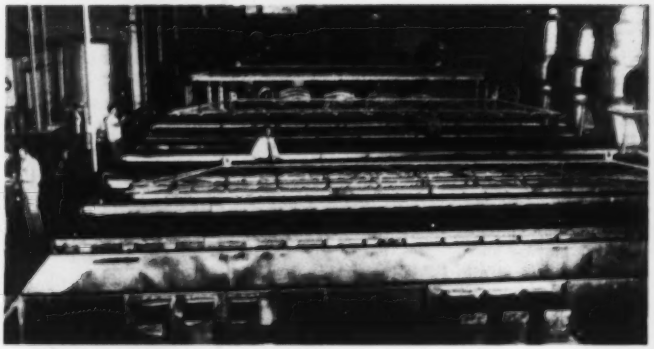
The Gains—The institute's new figures show open-hearth capacity is up 4.3 per cent over a year ago, electric capacity up 9 per cent, and crucible capacity up 100 per cent. Over-all, the steelmaking capacity in the United States rose 4.2 per cent in the last year.

The crucible capacity increase is the first one since 1945. From 3800 tons in 1945, the capacity dropped to 20 tons, where it remained until it rose to 40 tons on Jan. 1, 1952.

Details of the changes in capacities for making steel, pig iron and coke are shown in the accompanying table.

Surge Is Coming—Steelmaking capacity will surge forth 9.5 million tons in 1952, says a Steel Task Group report to Office of Defense Mobilization. The group, consisting of 36 members, was headed by Hiland G. Batcheller, chairman, Allegheny Ludlum Steel Corp., Pittsburgh. Planned capacity as reported by steel producers is scheduled to reach 118.1 million tons by Jan. 1, 1953, the report states. By Jan. 1, 1954, the capacity is to be 121.7 million tons, if all of the additional plans for expansion are carried out.

In support of the increased ingot capacity, pig iron capacity is scheduled to rise to at least 81 million tons by Jan. 1, 1954, and perhaps to 83.8 million tons on that date.



TEMCO TANKS: Texas Engineering & Mfg. Co. Inc. completed installation of six 5500-gallon processing tanks, a dryer, and an overhead bridge crane in its anodizing, alodining and chromodizing division. A control panel designed and fabricated by TEMCO maintenance department provides a centralized control for all three processes. The tanks are 39 feet long with solution depth of 5½ feet. Alkaline, cleaner, rinse, anodize and alodine tanks are ventilated

Blast Furnaces Set Record

A new high record for blast furnace production was set in 1951.

Reports just tabulated by the American Iron & Steel Institute show the year's output of pig iron and ferroalloys from the nation's blast furnaces reached 71,232,761 net tons, nearly 9 per cent over 1950's output. To attain this record, furnaces were operated at 98.3 per cent of capacity, compared with 91.4 per cent in 1950.

December's output was slightly higher than that of November. Details follow:

	Pig Iron	Ferromanganese and Spiegel	Total Blast Furnace Output
1951 (net tons)			
November	5,843,020	68,353	5,911,373
December	5,912,567	64,773	5,977,340
Year's Total	70,487,380	745,381	71,232,761
1950 (net tons)			
December	5,628,426	64,607	5,693,033
Year's Total	64,810,272	673,896	65,484,168

TCI To Use Lake Superior Ore

Lake Superior ore containing about 57 per cent iron will soon feel the heat of blast furnaces at the Tennessee Coal & Iron Division of United States Steel Co., Birmingham. The company says it will blend the rich ore with local ores, containing only about 37 per cent iron, in order to raise the output of the TCI furnaces.

Originally the company planned to use Venezuelan ores, but the South American development has not progressed as rapidly as expected. The domestic ore will be bought from U. S. Steel's Oliver Iron Mining Division.

Furnace Makers Cry for Nickel

An unreal allocation of nickel is limiting deliveries of industrial furnaces for the defense program, says the Industrial Furnace Manufacturers Association Inc.

At its mid-winter meeting in Pittsburgh, the association concluded that an adequate supply of materials and intelligent scheduling by the armed forces could overcome any difficulties in pro-

Steel Industry's Capacities: One Down, the Rest Up

	Jan. 1, 1952 (Net Tons)	Jan. 1, 1951 (Net Tons)	Change (Net Tons)	Change, Per Cent
Steelmaking (Total)	108,587,670	104,229,650	4,358,020	4.2
Open Hearth	94,972,780	91,054,020	3,919,760	4.3
Bessemer	5,381,000	5,621,000	240,000*	4.3*
Electric	8,232,850	7,554,610	678,240	9.0
Crucible	40	20	20	100.0
Blast Furnaces	73,782,340	72,471,780	1,310,560	1.8
Coke Ovens	67,060,240	66,260,640	799,600	1.2

*Decline. Source: American Iron & Steel Institute.

duction and deliveries. Association members also came to the conclusion that present production is not being used to best possible advantage.

Bright Spots in Seamless Tubing

Expansions by two companies may help take one dent out of the defense program—the one caused by the acute shortage of high-alloy seamless tubing.

Copperweld Steel Co. will put facilities to produce seamless tubing—including high alloy types—in the multimillion-dollar expansion of its electric furnace plant at Warren, O. Shenango-Agaloy Tube Co., Sharon, Pa., is planning a $3,640,000 tube plant with facilities to produce high-alloy tubing for the defense program.

Copperweld applied for an NPA certificate of necessity for its expansion and is understood to have arranged financing. Its position could be well protected by the expansion particularly if demand falls off after the defense program and if it were forced to produce carbon ingots in any of its ten electric furnaces.

Shenango-Agaloy got a $2.5-million RFC loan for its tube plant. Likely customers for its high-alloy seamless tubing: Aircraft manufacturers and the Atomic Energy Commission.

GE Modifies Payment Terms

From now on purchasers of General Electric Co. heavy apparatus will have to pay 80 per cent of the dollar value of the contract during the manufacturing cycle instead of the long established 50 per cent. In announcing this modification of its "terms of payment," GE said that payments will apply to all contracts in excess of $250,000 to be paid in equal monthly installments.

For contracts involving over 60 per cent value of heavy equipment requiring more than six months' manufacturing time combined with lighter apparatus taking less time, progressive terms of payment will apply to the entire transaction. If less than 60 per cent is heavy equipment, progressive terms of payment will apply only to that portion.

How To Stay in Business

Government offers advice and help to small manufacturers designated as hardship cases

IF YOU'RE one of the 3000 small manufacturers designated by NPA as a materials hardship case, don't count on having defense work thrown in your lap.

There's work to be had. But the bald fact is that there's an excess of production equipment for some types of defense products. To get a share of the business available, a real selling job on your part is necessary.

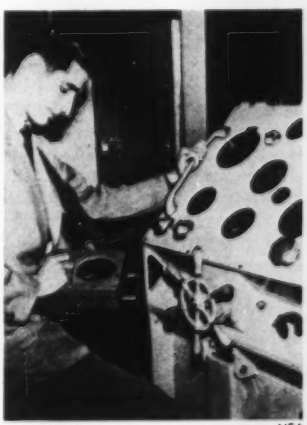
Relief? — Possibilities are good that the blow of materials and production cutbacks will be tempered by government action. That action would include help for you in lining up arms work or adjustment of materials rations where a plant shutdown would be inevitable. NPA, sounding out some 11,000 hard-hit manufacturers on effect of cutbacks on employment, may find materials relief the only solution. Setting of a floor beyond which materials won't be cut is another likely development; that would allow scheduling production with some degree of exactness.

One tool to get more business for small firms is the negotiated contract; work can be placed now with small companies at prices above the lowest offer. Small Defense Plants Administration is considering using its power to take on prime contracts and farm out parts to small outfits.

Educational—A major step in helping small companies with low allotments in their effort to get work was the NPA - Munitions Board sponsored industry assistance clinics held throughout the country. Only the 3000 companies under worst materials handicaps were invited; purpose was to match productive facilities with government buying agencies having need for those products. The clinics saved time and leg work for small businessmen: Every major buying agency of the armed services was represented at the clinics, as well as a diversified sample of prime contractors.

As an educational device, the clinics showed which doors to knock on and what procedure to follow. One man who attended put it this way: "We got information instead of an oration." NPA feels that if these clinics put a small fraction of the idled equipment to work they'll be worth the time and effort of individual consultations and trouble-shooting.

Some firms attending got useful information, some made helpful contacts, some found their equipment just can't be used by defense agencies, some found sample runs only were needed. Others are preparing to bid on specific products. All agreed that time was the vital factor. Unless they got work or help in a hurry, many admitted they'd be out of business.



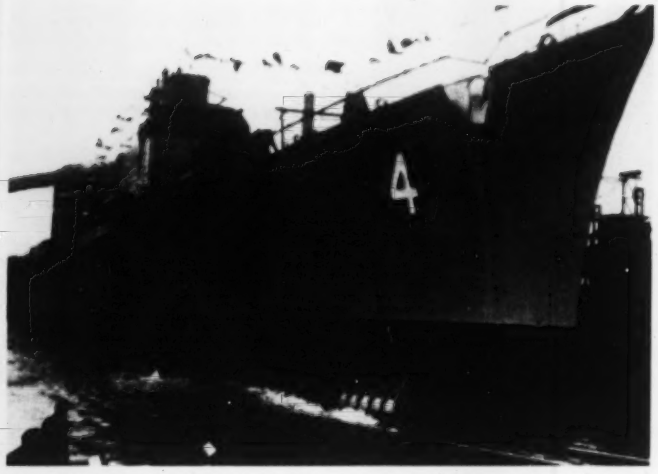
NEA

SPERRY IN A FLAT-TOP: Developed by Sperry Gyroscope Co., this portable controller will steer an aircraft carrier from remote parts of the ship. The device's "brain" can follow automatically zig-zag and other course schedules computed by special devices

Minerals, Metals Board Formed

A Minerals and Metals Advisory Board was organized under the National Academy of Sciences-National Research Council to replace the former Metallurgical Advisory Board. The new group will assume the old one's task of advising the chairman of the Defense Department's Research and Development Board. In addition it will advise civilian defense agencies through the director of the Bureau of Mines.

Dr. Francis C. Frary, technical adviser of Aluminum Co. of America, is the board's chairman.



SUPER DESTROYER. The *U. S. S. Willis A. Lee*, 3650-ton destroyer, slides down the ways at Bethlehem Steel Co.'s Quincy yard. The ship, designed to fight submarines, outweighs present heavy destroyers by 1125 tons

Look to Atom Industry for More Subcontracts

EXPANSION plans are slated to more than quadruple the atomic industry's investment in plant and equipment.

The new $5 billion to $6 billion increase proposed after President Truman's budget message would boost the total U. S. atom investment to more than $18 billion by 1957. Since 1943, $7 billion has been spent. The new expansion program is to be contracted out to private business firms.

Most of the proposed increase for the next five years would go into stepping up production of fissionable materials like uranium. Additional billions will be needed to operate these new fissionable production plants and to transform fissionable materials into weapons. Within five years, the U. S. plans to be turning out several hundred atom bombs, atom shells and atom warheads a year.

This new big program may also make it possible for the U. S. to produce sizable quantities of atomic dust which can be sprayed by a plane over a city. There'll also be atomic warheads in guided missiles that can be shot several hundred miles into enemy territory. The U. S. will use these smaller bombs in howitzer-like atomic artillery, and on atom-shell launching ships and submarines.

The atomic expansion program means that more American companies will get a basic knowledge of atomic methods and techniques. Because the same methods are used for producing both military and civilian fissionable materials, this knowledge will be of great value to industry for the day when the atom can be put to work by civilian industries.

Government contracts in excess of $250,000 follow:

PRODUCT	CONTRACTOR
Centrifugal Pumps	Red Jacket Mfg. Co., Davenport, Iowa
Water Filter	Refinite Corp., Omaha, Nebr.
Fans	Stuart F. Louchheim Co., Philadelphia
Generator Sets	Detroit Diesel Div., General Motors Corp., Detroit
Ignition Cylinders	Bayshore Industries, Elkton, Md.
Gun Tubes (155 MM)	Bethlehem Steel Co., Bethlehem, Pa.
Gun Tubes (90 MM)	Bethlehem Steel Co., Bethlehem, Pa.
Gun Tubes (90 MM)	Midvale Co., Philadelphia
Cartridge Cases	Rheem Mfg. Co., New York
Supports for Cartridge Tanks	Aluminum Specialty Co., Manitowoc, Wis.
Parts for Electrical Equipment	General Electric Co., Schenectady, N. Y.
Float Lights for Aircraft	Aerial Products Inc., Merrick, L. I., N. Y.
Synchros Control Transformers	Dealcam Corp., W. Newton, Mass.
Synchros	Robertshaw-Fulton Controls Co., Youngwood, Pa.
Diesel Locomotives	Fairbanks, Morse Co., Chicago
Head Assembly for Rocket	Parsons Fabricating Co., Traverse City, Mich.

New Uses for Atom Sought

Industry is on the lookout for additional uses of atomic energy in future civilian production. Industrial scientists are examining atomic fission by-products which might go toward balancing the high cost of atomic fuels.

Future power plants in addition to generating electricity may produce plutonium as fuel for other atomic power plants, says General Electric Co. Radiation for sterilizing food and drug products is another possible dividend from such installations. Gamma rays, now a useless by-product, might be used to sterilize drugs like penicillin and certain foods, with a view to keeping them longer.

Navy Orders More Ships

Signs indicate a new step-up in naval shipbuilding (see STEEL, Jan. 28, p. 40). Contracts were awarded for construction of five fleet oilers and reconversion of two heavy cruisers into guided missile ships, the Defense Department announces.

Three of the oilers will be built at a cost of $9.7 million per vessel by the New York Shipbuilding Corp., Camden, N. J. The other two oilers will be built for $10 million each by Ingalls Shipbuilding Corp., Pascagoula, Miss.

The two cruisers, the Boston and Canberra, will be converted for line-duty by the New York Shipbuilding Corp. The contract awarded for the two vessels is valued at approximately $30 million, says the Defense Department.

Pistons Out as Jets Come In

Assembly of the Pratt & Whitney J-47 turbojet engines recently awarded on a $30 million contract to Ford Motor Co. will be done at the Air Force-owned, Ford-operated plant in Chicago. But a major part of the manufacturing and subassembly will be concentrated in the Detroit area.

Production is not scheduled to begin for at least a year, but the J-47 will be "phased in" with the R-4360 Pratt & Whitney reciprocating engine as that contract is completed. After production gets going on the J-47, output of the piston engine will stop.

CHECKLIST ON CONTROLS

GOVERNMENT control orders are digested or listed each week in this "Checklist on Controls." For complete copies of NPA orders, write to NPA Distribution Section, First Basement, New GAO Bldg., Washington 25. For copies of OPS orders, contact nearest OPS district or regional office. For copies of OPS news releases, write David S. Phillips, director, OPS Administrative Services Division, Temporary E Bldg., Washington 25.

Materials Orders

ALUMINUM DISTRIBUTORS—Amendment of Jan. 25, 1952, to NPA Order M-88, adds aluminum conductor wire and cable products to the list of products whose distribution from warehouses is governed by this order. The action was taken to make the list in M-88 conform to the controlled materials lists of CMP Regulation 1 and Aluminum Order M-5. The new amendment was effective Jan. 25.

RUBBER—Interpretation 2 issued Jan. 23, 1952, to NPA Order M-5 says that a natural rubber crepe sole not attached to a shoe is still natural rubber and cannot be imported privately.

Controlled Materials Plan

STAINLESS STEEL — Direction 9 to CMP Regulation 1 removes non-nickel-bearing stainless steel, sometimes called chrome stainless steel, from CMP control. Direction 9 was effective Jan. 28, 1952. Consumers no longer need CMP-4B tickets to purchase the metal. Production of non-nickel-bearing steel will continue under control of the melt schedule order, M-80, by which mill production of all alloy steel is regulated, and under basic steel order M-1, which regulates steel production by directives. The 45-day inventory limitation also remains in effect.

STAINLESS STEEL — Amendment of Jan. 28, 1952, of Direction 1 to CMP Regulation 1 reduces from 1500 to 500 pounds the amount of nickel-bearing stainless steel which a person may obtain per quarter by self-certification of orders. The amendment was effective Jan. 28, 1952.

NPA Regulation

STEEL—Amendment of Jan. 28, 1952, of NPA Regulation 1 was made to include rutile and non-nickel-bearing stainless steel (chrome steel) in the list of materials subject to inventory controls. Rutile, a form of titanium dioxide, is in very short supply. Its important industrial uses are in the coating of electric welding rod, fiber glass, ferrotitanium alloys, ceramics and in the production of metallic titanium. Rutile inventories are limited to 45 days, or a practicable minimum working inventory, whichever is less. The same restrictions apply to chrome steel inventories. The amendment was effective Jan. 28.

Price Regulations

LEAD, ZINC—Revision 1 of Supplementary Regulation 70 to the General Ceiling Price Regulation authorizes an increase of 2 cents a pound in the ceiling price of the lead and zinc content for domestic lead and zinc ores and concentrates and other lead and zinc bearing materials. The revision, issued Jan. 24, 1952, applies to all deliveries made on and after Oct. 2, 1951.

COBALT—Amendment 14 of General Overriding Regulation 9 exempts from price control the service of converting cobalt ores and concentrates into cobalt metal and refined cobalt oxide. Amendment 14, issued Jan. 28, 1952, was effective Feb. 2, 1952.

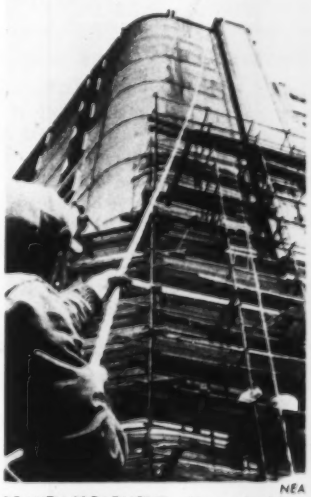
INDUSTRIAL DIAMONDS — Amendment 31 of Ceiling Price Regulation 30 makes it clear that the term "industrial diamonds" in Appendix D of CPR 30 includes diamond powder and boart. Amendment 31, issued Jan. 28, 1952, was effective Feb. 2, 1952.

MSA Funds Go for Economic Aid to Britain

DIVERTING MSA funds from military aid, the U. S. granted $300 million in economic help to Britain last week. It is the first sizable money grant to Britain since Marshall Plan funds were cut off. MSA Director W. Averell Harriman says that without the new assistance Britain would have to reduce its defense program by more than twice the $300 million amount.

The MSA funds will be spent for raw materials and components directly related to western defense against Communist aggression, and Britain agreed to spend sterling counterpart funds for the same purpose.

Price Increase Anyhow — Even with these funds and the 1 million tons of steel to come from the U. S., Britons expect an all-round price increase for steel products this year. The British are talking about making 16 million tons of steel again this year, maybe. The "maybe" is pig iron. To replace pig iron stocks raided last year and make up for reduced scrap imports, more than 10 million tons of iron ore must be imported in 1952 at high prices. Costs are further rising for steel consumer industries due to increases in coal prices and freight rates.



NEA

BEAUTY TREATMENT: Heavy building materials are hoisted up the scaffold face of the Royal Institute of Natural Sciences in Brussels, Belgium, in a major improvement program made possible by Marshall Plan funds

Canadians Want To Refine More

Canadians are demanding a plan for refining more of their raw materials before export similar to that applied in the pulp and paper industries. At present, not a bit of raw pulp leaves Canada. Reason for the new demands is a drop in the ratio of ores smelted in Canada before export: Between 1941 and 1951 the proportion of copper smelted increased from 80 per cent to 90 per cent; lead dropped from 95 per cent to 85 per cent; nickel dropped from 60 per cent to 55 per cent and zinc dropped from 90 per cent to 65 per cent. Also, it costs Canadians 20 times the price of titanium slag shipped out to get back titanium oxide.

Belgium Limits Trade to E.P.U.

Belgium is now allocating steel deliveries to nations within the E. P.U., and a special export tax on steel products to these countries has been rated at 3 per cent. To keep full production, Belgium has several alternatives to limited trade within the E.P.U.: 1. Increase exports to dollar areas, 2. promote payments in gold, 3. increase the home market and 4. increase trade with Belgian Congo. Brightest prospects seem to be in trade with dollar areas and the home market, where the defense budget will call for greatly increased buying this year.

Promoting trade with the U. S. are favorable export prices. For shipment to E.P.U. countries, bars sell for $140 per metric ton, and heavy sheets $190 per metric ton. To the U. S. and dollar zones, prices are about $130 and $160.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor*

ERIC JOHNSTON'S new job is regarded in Washington as one of the most important in the government at the moment. As chairman of the new International Development Advisory Board he is to lay down policy for the Point Four program rendering technical assistance to underdeveloped countries.

No fewer than 21 government departments and agencies now have a hand in this program—principally W. Averill Harriman's Mutual Security Agency, the Defense Department and the State Department's Technical Cooperation Administration. Mr. Johnston will co-ordinate all these activities so that the aid we give to foreign countries not only will help build up our allies militarily, but promote friendly relations with and raise living standards in countries not in the Russian orbit.

Emphasis—Right now the emphasis—aside from military objectives—is on helping backward countries to set up programs of national health, education and agriculture.

Progress is being made also in direction of greater industrialization. Right now State Department's TCA is hiring six experienced men to go to Middle East countries to promote industrialization in that area.

While the government generalizes about the purposes of technical assistance and the Point Four program, the ultimate objective is much more realistic: To develop markets for more American products.

Thus the increasing number of dollars we must spend abroad for raw materials in which we are deficient will come back here for machinery and other American products that the world needs. The goal is more cash business for American manufacturing plants and more work for American labor.

Indoctrination Interlude . . .

Salary Stabilization Board warns employers that its field offices—soon to be established—will be able to settle only the simplest cases at the beginning. "The staffs will need time to become indoctrinated; but they will receive cases, analyze them and, working closely with Washington headquarters, greatly expedite service to businessmen. Later they will be able to make more case decisions on the spot." First six field offices will be opened early this month in Boston, New York, Detroit, Cleveland, Denver and San Francisco. Later on, offices will be established in Philadelphia, Richmond, Atlanta, Chicago, Minneapolis, Kansas City, Dallas and Seattle.

Sans Salt . . .

The O'Mahoney bill (S. 5) authorizing the Interior Department to start research to find a practical and economical method of converting sea water into potable water has been reported favorably by the Senate Committee on Interior and Insular Affairs and is awaiting action by the upper chamber. Increasing consumption of water, especially by industry, is becoming a matter of national concern, says the committee report. It points out that the level of ground water in important sections of the country is being lowered at a dangerous rate.

Agreement in Principle . . .

What about compensation to American companies whose patents and know-how are used by NATO countries to produce munitions? The State Department has sent a delegation to Europe on this matter. Informed spokesmen say that there is agreement on both sides of the Atlantic that "fair compensation" should be made for the use of privately-owned patents in the mutual security program; the only point at issue is the drafting of such an agreement in language and terms acceptable to all parties.

Comings and Goings . . .

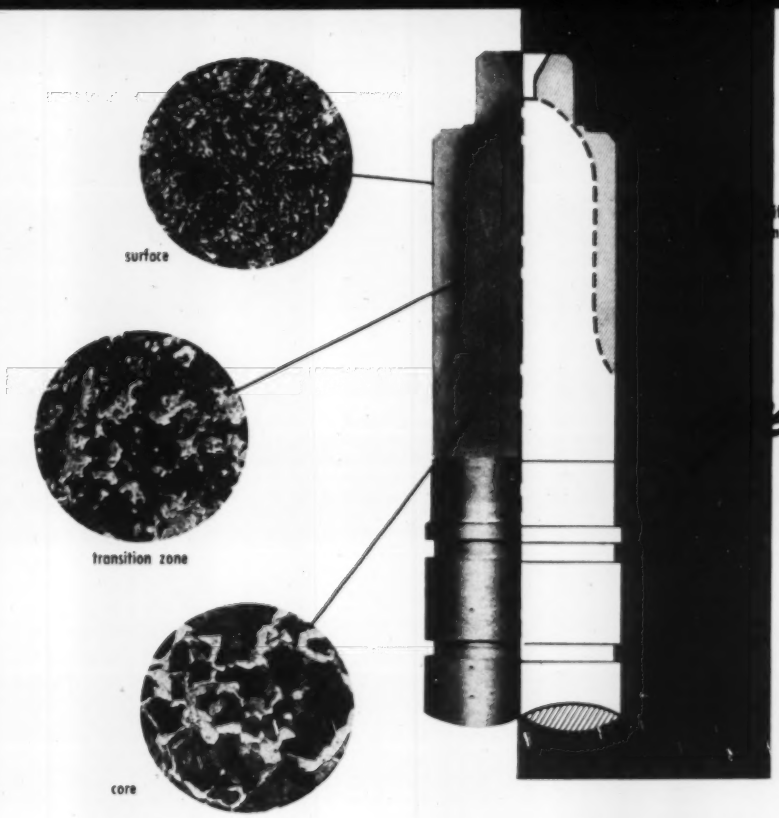
Jess Larson's Defense Materials Procurement Agency completed absorption of Interior Department's former Defense Minerals Administration. James Douglas, former DMA official now in DMPA (its job: Increasing the supply of critical and strategic minerals) are Tom Lyon, Charles E. Stott, Harold Montag, John G. Ford and A. B. Parsons.

Franz T. Stone, head of NPA's Industrial & Agricultural Equipment Bureau, took over the second-ranking NPA post of Deputy Administrator when Henry M. Fowler moved up.

Frank H. Davidson, on leave from Jones & Laughlin Steel Corp., replaced John Walker, returned to United States Steel Co., as chief of the Bar and Semifinished Section, NPA's Iron and Steel Division.

GSA Saves $80 Million . . .

General Services Administration reveals that savings and economies worth $80 million were accounted for in fiscal 1951, the second year of operation for the agency. The report shows that more than $42 million was saved in the Federal Supply Service while the Public Building Service saved $36.3 million. Largest single economy—$26 million—was from lower prices through consolidated buying.



ifficult hardness pattern
n multiple diameters

ecified

achieved

by **flamatic** selective surface hardening

...with electronic temperature control.

Compare this drawing of a hardness pattern for a drive shaft (above right) with the etched section of the actual part (above left) after Flamatic precision hardening. It is dramatic visual proof that Flamatic selectively hardened this part to the toughest sort of specifications.

But more important: the two diameters (pilot and splined portion) were hardened **in one operation** at the rate of 200 shafts per hour. Standard flame heads are arranged to concentrate the desired amounts of heat in the right areas. Hardening each diameter separately wouldn't do, for the second operation would alter the pattern produced by the first. This shaft, length 9-1/16", pilot OD: 51/64", spline OD: 1½", SAE 4140 is one of fifty or more parts Flamatic-hardened by Rockford Clutch Division of Borg Warner Corp. Surfaces are heated to within plus or minus 5°F of preset values by exclusive electronic temperature control. Quick positive setups make small lot production convenient and economical. Adaptability to wide range of parts (gears up to 18" and shafts up to 30" long) makes Flamatic a profit-producing investment for scores of users. Write for informative booklet, Publication M-1658.

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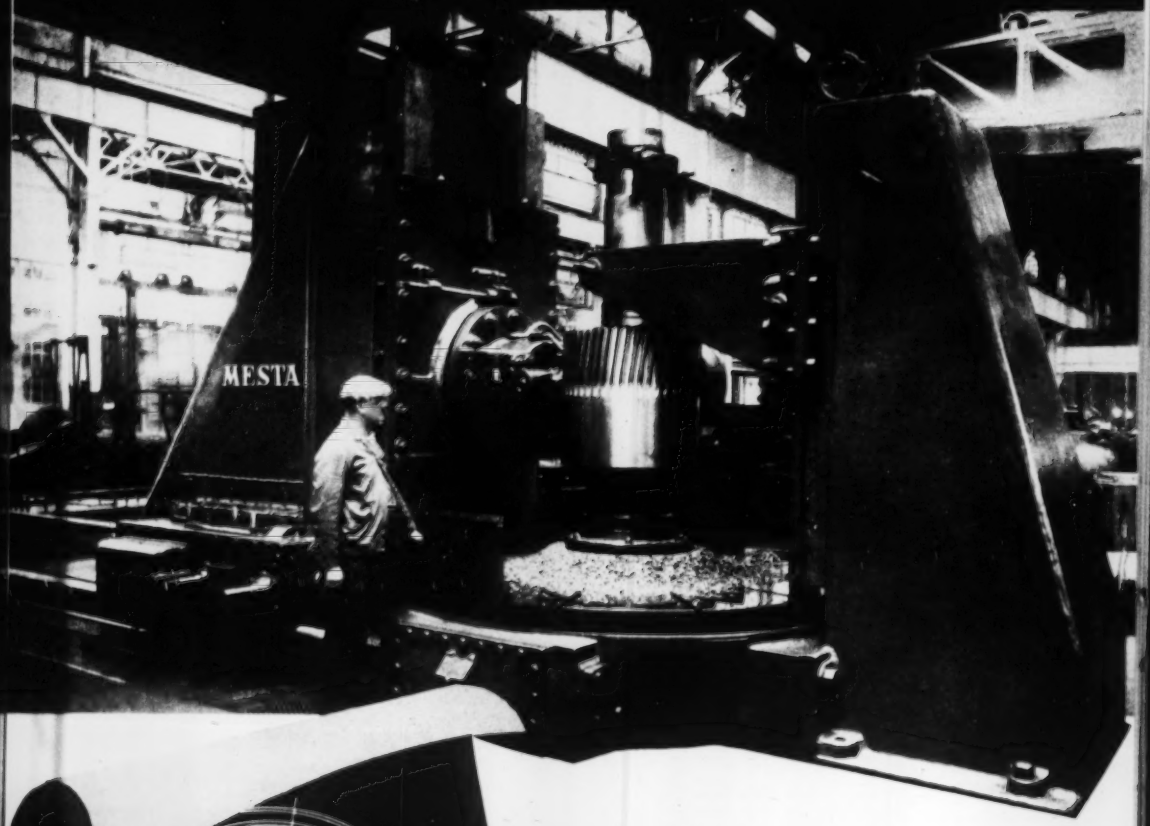
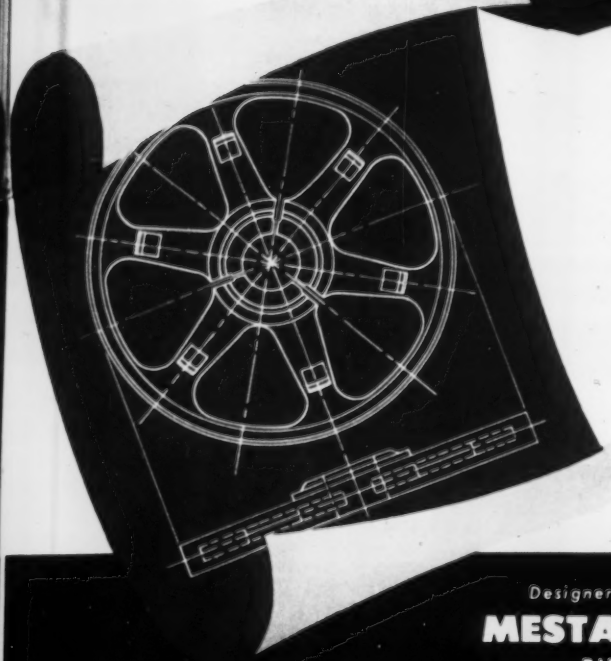
MESTA GEAR DEPARTMENTS





Mesta gear cutting equipment includes all the necessary heavy duty machine tools to produce gears up to the largest sizes used by industry. These ruggedly constructed machine tools, including Mesta Gear Planers and Hobbers, are specially designed to enable skilled workmen to produce the most accurate gear teeth possible. A Mesta 16 Foot Heavy Duty Gear Hobber is illustrated.

Designers and Builders of Complete Steel Plants

MESTA MACHINE COMPANY

PITTSBURGH, PENNSYLVANIA

Aluminum: Heavy Expansion in a Light Metal

In another two years the U. S. capacity to make primary aluminum will be up 80 per cent. This and the hope for peace inspire producers to think about new markets

By VANCE BELL, *Associate Editor*

Aluminum companies, looking to the day they'll be hunting for customers, are counting on their research laboratories to help find many new applications for the light metal

THE ALUMINUM industry, with nary a pound of metal to sell today in the "free" market, is looking for customers. Customers, not for now, but for the time when it'll have twice as much aluminum as today, and maybe no big military outlet for it.

Now the United States aluminum industry has a productive capacity of 1698.5 million pounds of primary aluminum, all in three companies. By the end of 1953, if all of the present expansion plans are carried out, there will be four producers with a total of 2851.5 million pounds of capacity that can be operated economically, or 3009.5 million pounds if some uneconomic capacity, operated only in times of emergency, is included. This is nearly an 80 per cent increase. In 1943, peak year of aluminum production for World War II needs, output was only 1840.4 million pounds.

Not only can primary aluminum be counted on for an increase but so can secondary aluminum. Secondary is made from scrap. The greater the primary aluminum production, the more aluminum that eventually finds its way back through scrap channels.

So, the end of another two years should see the possibility of a production of nearly two pounds of aluminum for every pound today, with the potentiality of an added amount through secondary smelters.

Good Reason—This doubled production probably would not be too much for a national defense build-up or for a war. But wars don't last forever. So, the aluminum industry has a compelling reason for looking now for new peacetime markets.

Yet the industry's brow is not furrowed with worry over whether all the additional aluminum can be used. It's just a matter of finding ways to use it. That shouldn't be an impossibility, reason some of the aluminum industry men, since the solution of a problem deep in Texas.

The sun there gets so hot it melts wax charts electric companies use to record data in meter enclosures, but the problem was licked with aluminum. Developed by the Corpus Christi Sheet Metal Works, aluminum boxes are protecting meters against sand and moisture, and the metal's heat-reflecting properties keep the instruments cool in hottest weather.

If you can lick the Texas sunshine, what other problems are there to fear?

An Eye for Business—In looking for new markets the aluminum industry is casting a most covetous eye on the electrical industry. Since World War II, building products have led the field in aluminum consumption. Transportation has been a growing customer; power transmission has been a good one too.

Now the whole electrical field looms more prominently in the aluminum orbit because of the copper shortage, the desire for lightweight products, the progress that has been made in using and joining aluminum, and the increase in application of electric energy.

Electric light bulbs are a good example of the aluminum industry's latest acquisition of a good customer in the electrical field. Those silver-colored bases that have begun to appear on incandescent bulbs are aluminum. Development of this application is an outgrowth of several years of cooperative research by metallurgists of lamp companies, aluminum producers and solder manufacturers.

Official OK—Although aluminum is currently on the critical list, this new use has approval of the National Production Authority because it replaces brass which is even scarcer. The bulbs are identical in life, efficiency and cost with the familiar brass-based bulbs, says General Electric Co., one of the manufacturers participating in the development.

Successful use of aluminum for lamp bases required an alloy that would withstand the high temperature involved in assembling the bulbs. It also required development of a solder and a flux suitable for the high-speed automatic soldering of the filament lead-in wire to the shell of the base. Exhaustive tests were made as to electrolytic corrosion in brass and copper sockets, corrosion characteristics in various atmospheres, and contact resistance between the base and socket. The aluminum came out with flying colors.

When the aluminum supply

More Aluminum and Where It's Coming From

U. S. Annual Primary Capacity in Millions of Pounds

	In Operation	Under Construction (To be completed in 1952)	Planned (To be completed in 1953)	Total
ALUMINUM CO. OF AMERICA				
Alcoa, Tenn.	290.6	. . .	. . .	290.6
*Badin, N. C.	67.7	. . .	. . .	67.7
*Massena, N. Y.	118.0	. . .	. . .	118.0
*St. Lawrence, N. Y.	110.0	. . .	. . .	110.0
Point Comfort, Tex.	114.0	70.0	. . .	184.0
Vancouver, Wash.	152.2	. . .	. . .	152.2
Wenatchee, Wash.	. . .	170.0	. . .	170.0
Rockdale, Tex.	. . .	170.0	. . .	170.0
	852.5	410.0	. . .	1,262.5
REYNOLDS METALS CO.				
Jones Mills, Ark.	189.0	. . .	. . .	189.0
Listerhill, Ala.	100.0	. . .	. . .	100.0
Longview, Wash.	63.0	40.0	. . .	103.0
Troutdale, Ore.	144.0	7.0	. . .	151.0
Corpus Christi, Tex.	. . .	150.0	10.0	160.0
Site unselected, Ark.	. . .	. . .	110.0	110.0
	496.0	197.0	120.0	813.0
KAISER ALUMINUM & CHEMICAL CORP.				
Mead, Wash.	300.0	40.0	. . .	340.0
Tacoma, Wash.	50.0	. . .	. . .	50.0
Chalmette, La.	. . .	200.0	200.0	400.0
	350.0	240.0	200.0	790.0
ANACONDA COPPER MINING CO., HARVEY MACHINE CO.				
Kalispell, Mont.	. . .	. . .	144.0	144.0
Grand Totals	1,698.5	847.0	464.0	3,009.5

*Alcoa currently is operating 158,000,000 pounds of capacity with normally uneconomical power sources; 19,000,000 pounds of this capacity is at Badin, N. C., the rest divided between its two adjacent New York plants, with 29,000,000 pounds at Massena and 110,000,00 pounds at St. Lawrence.

again becomes favorable, the leading manufacturers expect to adopt the metal as the standard material for the bases of most bulbs. Until then both aluminum and brass probably will be used.

Giant Steps—With that demonstration that problems in the use of aluminum for electrical purposes can be solved, a big stride forward in the use of the metal in the electrical field was made.

Because aluminum's electrical conductivity is only 64.9 per cent that of pure copper, aluminum was handicapped in competition with copper for electrical wiring in houses and other buildings. To carry a given amount of electricity, aluminum wires have to be bigger than copper wires, and this meant fewer wires could go in conduits. Thinner insulations were developed; now more strands of aluminum wire can be wriggled into a conduit.

Solution of problems like these sparks additional enthusiasm over the electrical field as a bigger and better customer for the aluminum industry.

Market to Cultivate—Farms are no poor country cousin as a market for the aluminum industry. Speaking before a national farm convention, Harry L. Smith Jr., manager, sheet and plate sales, Aluminum Co. of America, Pittsburgh, said, "We believe the farm field offers excellent possibilities for further development." This belief is based on the farmers' acceptance of aluminum. He pointed out that his company's aluminum roofing sheet covers more than 1.5 million farm buildings, although that product was not introduced until after World War II.

Another good example is aluminum irrigation pipe, which first appeared in 1946. While only 500 miles of this pipe were sold the first year, 14,000 miles of it are in use now on American farms.

Proof that aluminum is moving more and more into our everyday affairs is the development of an aluminum can or package to replace that little symbol of American life, the tin can.

At the Crossroads—In competing for markets, aluminum has had a price advantage. Its price trend has been in a general downward direction. In 1890, the aluminum price was $5 a pound; in 1893, $3; in 1900, 33 cents. Today aluminum pig is 18 cents a pound. And the aluminum industry is at the crossroads. Can it go farther down the one of declining prices?

Only time can answer that question, but the industry is making every effort to at least hold the line. Because large amounts of electric power are needed to reduce alumina into aluminum the aluminum industry naturally is looking for ways to cut its power costs. Thus far, hydroelectric power is the cheapest it has found, but all of the hydroelectric power sites in the United States sufficient for aluminum reduction plants have been pre-empted.

To help provide the additional aluminum reduction capacity needed for the present defense effort, the aluminum industry resorted to natural gas and lignite as fuel for electric power generating plants. The need for great blocks of electric power around the clock at very low costs determines the sites for the country's six new aluminum reduction plants. Two are in the Northwest, where hydroelectric power is available. The other four will be in the South, three of which will have power plants using natural gas. One plant will obtain its electric power supply from lignite, a fuel not heretofore employed for the production of aluminum.

Vital Fraction — The reason that power costs are a highly important factor in producing primary aluminum is that every tenth of a cent in the cost of a kilowatt-hour of electricity means a penny in the cost of a pound of aluminum pig. It takes approximately ten kwhr of electricity to make a pound of aluminum.

With big supplies of low cost

electricity so important in aluminum reduction, the aluminum industry is working with the Atomic Energy Commission in an effort to apply atomic energy to electric power production.

But wouldn't it be even better not to have to depend at all on electricity to reduce alumina to aluminum? Why not use chemical methods? The aluminum industry's research men are working on that too. They always have been able to do it chemically. That's the way aluminum was first produced 127 years ago. But the hurdle they haven't got over is: How to do it economically by chemical methods.

Another way to cut down dependence on electric power would be to find a way of reducing the number of kilowatt-hours needed to produce a pound of aluminum. The industry's working on that too.

Watch Canada — The United States aluminum producers have at least a two-fold reason for being so intensely interested in low production costs. The lower the price on aluminum the easier it will be to find markets for the doubling volume of productive capacity. Also, Canadian aluminum looms as a strong competitor.

Aluminum production in Canada is largely the result of low-cost hydroelectric power. Aluminium Ltd., whose principal operating subsidiary is Aluminum Co. of Canada Ltd., is accepted as the lowest-cost producer of ingot. In 1951, the subsidiary, popularly known as Alcan, produced 900 million pounds, or around 54 per cent as much as was turned out by the three current producers in the United States.

Alcan is constructing new power plants and smelters in Quebec that will increase production by approximately 90 million pounds in 1952 and another 90 million pounds in 1953. An even larger new development in the British Columbia wilderness will add about 180 million pounds annually by 1954 and could eventually be economically developed to support a capacity of more than 1 billion pounds annually. Eventually, Canada would be turning out 2.1 billion pounds a year, compared with around 3 billion pounds the United States could be producing by the end of 1953.

The Bottleneck — The United States portion of the North American aluminum industry expansion is costing more than $500 million. The expansion is centered in facilities for making primary aluminum. That's because the bottleneck is in that segment of the industry.

There is plenty of unused capacity for fabricating products, such as sheet, tubing and castings.

When the presently projected expansion is completed the three primary producers will retain their current relative position as to size: Aluminum Co. of America, first; Reynolds Metals Co., second; and Kaiser Aluminum & Chemical Corp., third. A newcomer, Anaconda Copper Mining Co. and Harvey Machine Co., will be in fourth place.

There's more aluminum in your future. As these stacks of pigs show, the nation's primary aluminum capacity will nearly double in two years

For this first quarter of 1952, approximately 60 per cent of the aluminum output is allotted for defense and defense-related production, with the rest going for civilian manufacture. Just when more aluminum will be available for civilian uses, no one can say for a certainty. That depends largely on the trend of military developments.

But one thing aluminum industry men do feel certain about is their products' future. They think it's as bright as the metal they make and sell.

Revival for Magnesium

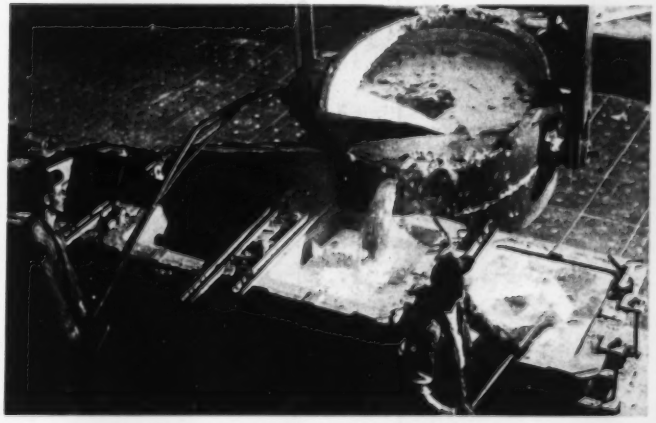
The government set a goal for domestic production of primary magnesium ingot.

By 1953 it hopes there will be 29,500 tons coming from privately owned plants and about 102,000 tons from reactivated government-owned standby facilities.

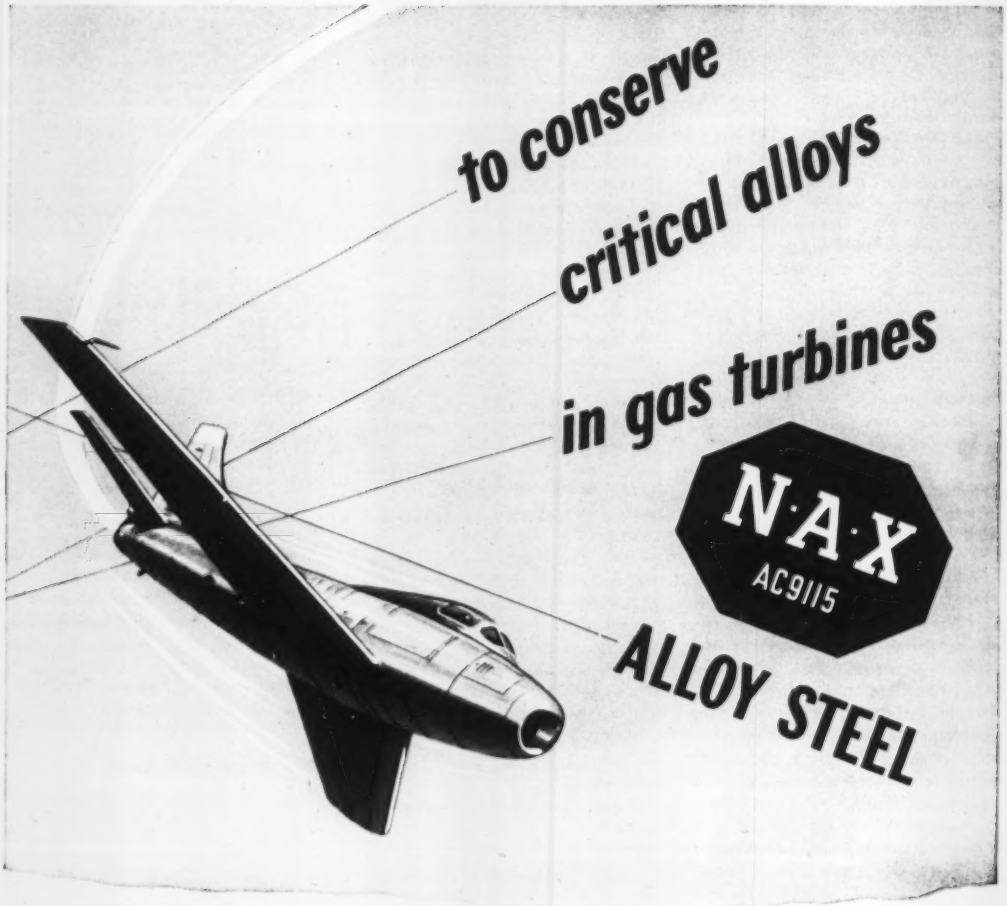
Attainment of this goal will not require issuance of any more certificates for rapid tax amortization for magnesium ingot producing facilities, since the necessary expansion already has been provided for.

The expansion goal does not extend to facilities beyond the ingot stage. If such additional fabricating facilities are needed they will be covered by a separate expansion goal determination.

The ingot expansion program calls for additional cells to be installed in Dow Chemical Co.'s Freeport, Tex., plant to increase its capacity to 29,500 tons. Six of the government's seven standby plants are reactivated.



MORE AND MORE ALUMINUM WILL POUR FORTH
. . . so an eye is being peeled on markets for the future



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NATIONAL STEEL CORPORATION

By H. C. TUTTLE *Detroit Editor*

Mirrors of Motordom

Now that three General Motors cars use power steering there's speculation as to how soon this device will be adopted by other makes

DETROIT

INTRODUCTION of hydraulically assisted steering in Buick, Oldsmobile and Cadillac excites speculation as to whether all cars will sooner or later contain some such device to reduce steering effort.

Chrysler, of course, pioneered in the passenger car field when it began equipping 1951 models with Gemmer Mfg. Co.'s unit.

The three General Motors car building divisions which now offer Saginaw Steering Gear Division's version of power steering are naturally enthusiastic about the bright future.

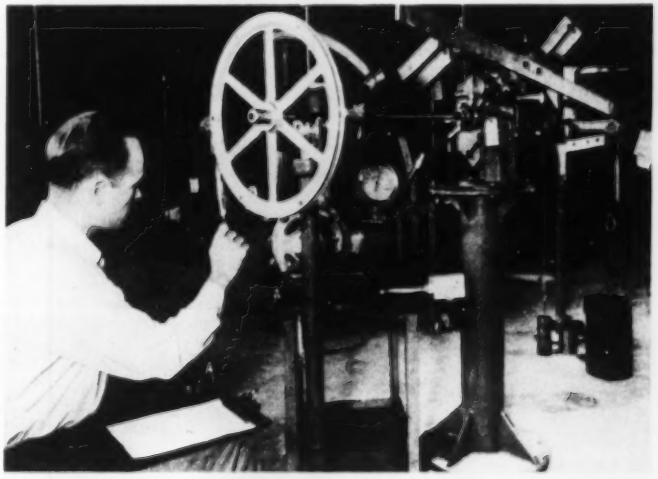
Popularity Contest—Whether it can achieve the popularity of automatic transmissions or "hard-top" styling and in such short order is problematical. An important consideration is cost. The $200 price tag which such devices currently bear will be a tough hurdle. An extra charge of somewhat near that magnitude, however, has not proved to be the deterrent to automatic drives which it might have been. If the public becomes convinced of its worth, the big dollar sign dwindles in importance.

An indication of what may happen was given recently by Ross Gear & Tool's vice president in charge of engineering, W. K. Creson. Speaking before the annual meeting of the Society of Automotive Engineers, he said that production of power steering units for cars and trucks was about 10,000 in 1950, 40,000 in 1951 and may be about 200,000 in 1952. "After a slow start, power steering today is moving fast. Its further growth depends on more developments, simplification, and particularly cost reductions. It also, momentarily, at least, depends on availability of materials and tools as affected by conditions of war," he states.

Long Pull—Few automotive devices have taken so long to be brought to the market. But it is not that their developers haven't tried. Saginaw Gear's method applying hydraulic power to help the driver has been available to GM division since 1942. It has been under development by that GM division for 20 years. Power steering of various types has been incorporated in special-purpose vehicles since the '30s and during the war was used in armored cars and many types of off-the-road equipment. Saginaw's unit, of which the passenger car gear is basically a scaled-down version, saw military service and since war's end has been in steady production for Caterpillar Tractor's wheeled earth-moving equipment.

Essentially it appears as though the car makers have been waiting for a public expression of desire for power steering. Car designers have been forcing greater problems on the steering gear makers for a good many years. They've done it by reducing tire diameter and increasing tire section, lowering tire air pressure, and loading more weight on the front end. The steering gear makers rose to the challenge by increasing the mechanical efficiency of their gears and upping the steering gear ratio so that more revolutions of the steering wheel were needed for a given movement of the front wheels. These avenues, it is felt, are ending in a cul-de-sac, although Lincoln's new front wheel suspensions may show a way out.

"Feud of the Feel"—Traffic congestion, long-distance driving at high speeds, parking problems, greater proportion of older drivers and of women drivers suddenly have brought to the fore the need for reduction in steering effort. How much reduction presently is a moot question. This brings up a developing and lively controversy between Chrysler and General Motors engineers which might be called the "feud of the feel." Chrysler's Hydraguide, combined



POWER STEERING: General Motors' version of power steering is tested at the Saginaw Steering Gear's testing laboratory. When the hydraulic unit is operating it takes from 3 to 4 pounds of pressure on the wheel to lift the small weight on the output shaft with only a small amount of hydraulic assist. While 8 pounds of pressure, hydraulically assisted, will lift the heavier weight, 35-pound wheel pressure is needed when the unit is turned off

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LINCOLN STYLING: This Capri special custom coupe is one of five body styles in two series offered by Lincoln for 1952. "All new" styling includes straight-line fenders, recessed headlights, sloping hood, high bumpers and suspended foot pedals inside. The power comes from a new 160-horsepower V-8 engine

SOME WAGON!: Officially dubbed Ranch Wagon, this 1952 Ford is an all-metal utility car for business or pleasure. It's two-seat arrangement will carry 6 passengers or the rear seat can fold into the floor to form a load area for light hauling. Powered by either the 6-cylinder or V-8 engine it is in the Mainline series

with lower steering gear ratio, gives a "faster" steer and at the same time comes into action at a touch of the wheel. Saginaw's unit deliberately maintains about the same ratio and comes into play only after 3 to 4 pounds of pull are applied to the steering wheel. GM people believe Chrysler is giving the public too drastic a change. But Chrysler maintains, and GM virtually concedes, that the GM unit will ultimately be revised to begin action immediately and to reduce steering gear ratio.

Watch for Developments—One of the reasons the present units are probably not the ultimate development is that they are merely applications to manual steering. And a major beef of steering gear designers is that after everybody else they come first in the car designer's plans. Finding room for the hydraulic mechanism has posed some of the toughest problems in these first units. And having finally found locations, considerable difficulty has been encountered in reducing the noise level of the hydraulic fluid pump.

Presently known to be dickering for power steering devices are Packard and Lincoln.

New Look for Ford and Lincoln

A new set of words must be learned to talk with any degree of exactness about the new Fords. Included in the vocabulary now must be such terms as "tailored-to-model," in referring to the springs; "Mainline," "Customline," and "Crestline" in referring to the standard, deluxe and super deluxe series; "Coacheraft" in discussing the body; "Ranch Wagon," "Country Sedan," and "Country Squire," in designating the three series' station wagons.

Once the language is mastered, you can get into the serious business of examining the cars in detail. Immediately obvious is brand-new styling. Ford's identity is maintained primarily in the grille, although a triple "spinner" with the side ones housing the parking lamps and a slotted vertical stamping replaces the twin spinner-solid grille of the 1951s.

Topping It Off—The top is made in a single section instead of incorporating the windshield pillars as formerly was done. In such places as the door openings, footings and upper pillar joints the corners are rounded to increase body strength and improve sealing. New "K"-member frames with five cross members are of heavier construction for greater torsional rigidity.

To go along with the new body is a new six-cylinder overhead valve engine, called "the Mileage Maker," which develops 101 horsepower.

In this engine integral valve guides are cast as part of the cylinder head and the valves are self-rotating to provide tight seating. Cylinder block and crankcase are cast in one piece extending below the center of the crankshaft.

Debut—Shell-molded cast iron alloy crankshafts, camshafts and exhaust valves make their debut in this engine and in the V-8.

There are six different sets of front coil springs to match the various body-engine-transmission weights. Rear springs also are tailor-made.

Lincoln Shines Too—Big-brother Lincoln is not to be outshone. In two series—the Cosmopolitan and the Capri—the Lincoln has five body styles, and is as new design-wise as the Ford and Mercury.

Top feature is a new overhead valve V-8 engine. It is unique in several particulars and incorporates such innovations as a combination carburetor - air cleaner which squats compactly on the top of the engine. A shell-molded crankshaft, two-section muffler, and direct-flow exhaust manifold system are other highlights.

In the Lincoln an entirely new independent front wheel suspension system developed by Thompson Products Inc. and employing ball joints is incorporated.

Auto, Truck Output

U. S. and Canada

	1951	1950
January	645,688	609,882
February	658,918	505,595
March	802,737	610,678
April	680,281	585,707
May	695,898	732,164
June	653,682	897,852
Six Mos.	4,137,204	3,941,878
July	522,858	746,801
August	571,442	842,335
September	505,758	760,848
October	548,350*	796,012
November	480,323*	633,876
December	391,272*	671,621
Week Ended	**1952**	**1951**
Jan. 5	83,601	100,072
Jan. 12	92,741	139,787
Jan. 19	98,669	161,867
Jan. 26	94,123	167,913
Feb. 2	100,000*	151,206

Sources: Automotive Manufacturers Association, Ward's Automotive Reports. *Preliminary.

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Second, keep him *informed* of what products you regularly need—particularly of those you have difficulty getting. His contacts may prove valuable to you . . . he can often suggest satisfactory substitutes for hard-to-get items. He is just as eager to ship you scarce items as you are to get them—he will do his utmost to keep you supplied if you'll tell him what you want.

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THE COMPLETE QUALITY LINE

106 YEARS MAKING STRONG THE THINGS THAT MAKE AMERICA STRONG

The Business Trend

Government shuffling of defense schedules may be responsible for lull in industrial production. A formidable problem facing the economy this year is inflation

REJUGGLING of the defense schedule and consequent refiguring of the sacrifice required from civilian manufacturing are playing hob with producers of both civilian and military goods.

The present lull in industrial production may be attributable partially to this governmental indecision. Manufacturers don't know just where they stand or on what basis to plan for the future.

Inflation Pressures—Behind the immediate problems of a rearming nation is the omnipresent danger of inflation. Guy wires on the inflation balloon can be slackened this year from four directions: Wage raises, defense spending, a Treasury deficit, and a consumer buying wave.

Outcome of the steel wage talks will settle the question of a wage-price leapfrog this year. The decision there will affect directly or indirectly every segment of industry. The government policy of high spending and operating in the red is conceded to be inflationary. A Treasury deficit won't add pressure till the second half of the year though, because income tax payments make for a surplus in the first half of the calendar year. Defense spending isn't adding goods to sop up consumer purchasing power, and consumers, clearing up post-Korea debts, may loosen their purse strings this year. They're more apt to do so as the cost-of-living index continues its seemingly inexorable rise (it's now about 6 per cent above a year-ago and nearly 12 per cent over pre-Korea). With more supplies this year set aside for military and industrial expansion needs, stocks of some civilian goods are sure to shrink.

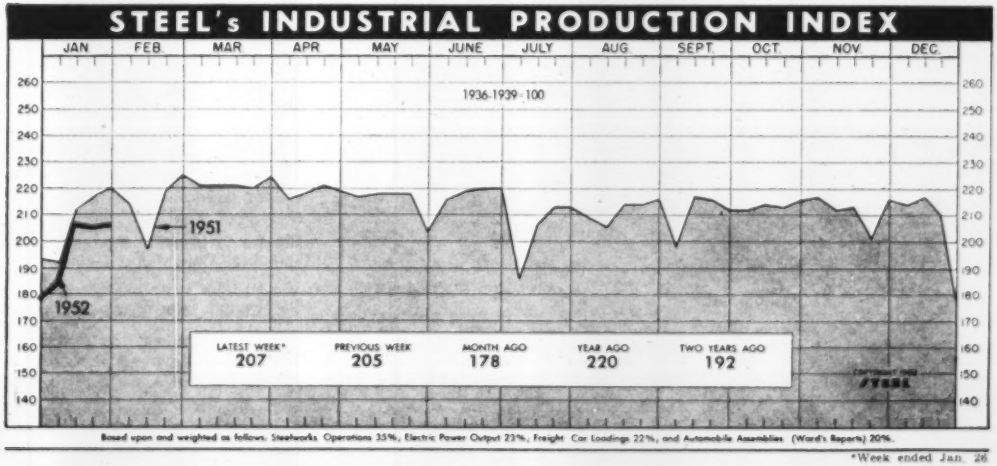
Index Edges Up—Signs of life are reappearing in slump-ridden civilian goods fields. But industrial activity going into February isn't setting records. Total production for January should be at or slightly lower than the December level. STEEL's weekly index of production for the week ended Jan. 26 edged up 2 points from the preceding week to 207 per cent of the 1936-1939 average.

Chief Depressant . . .

If automakers were producing at maximum volume permitted under NPA limits, the production index would be five or six points higher than at present. Labor disruptions are now the chief cause of low assembly rates in Detroit; model changeover troubles hampered completions most of January. Annual output at the current pace would net less than 3,250,000 cars says *Ward's Automotive Reports*. At this time last year the rate was exactly double that level. Truck completions continue steady, but the January total will run about 20,000 less than last year. Turnout of both cars and trucks in the week ended Jan. 26 was 94,123 units from U. S. and Canadian plants, says *Ward's*. That's about 4500 units less than were assembled the week before and 73,790 under the corresponding week of 1951.

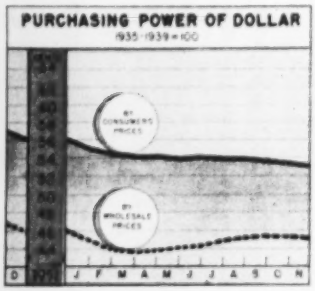
Floods Hurt . . .

Signs of easing in demand for some steel products keep reappearing, but there's still an excess of demand over supply. Product-mix of steel mill turnout may take on new proportions in coming months, but total production will keep rising as new capacity comes into operation. Slight easing in scrap supplies is allowing return to operation of several shut-down furnaces. American Iron & Steel In-



Based upon and weighted as follows: Steelworks Operations 35%, Electric Power Output 23%, Freight Car Loadings 22%, and Automobile Assemblies (Ward's Reports) 20%.

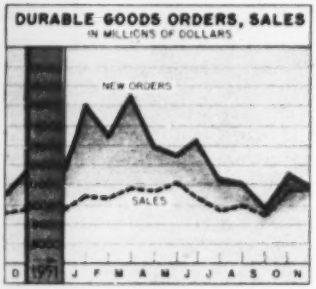
*Week ended Jan. 26



Purchasing Power of the Dollar
Cents, as measured by:

	Wholesale Prices		Consumers' Prices	
	1951	1950	1951	1950
Jan.	44.6	53.1	55.1	59.5
Feb.	43.8	52.7	54.4	59.6
Mar.	43.7	52.7	54.2	59.4
Apr.	43.8	52.6	54.2	59.3
May	44.0	51.6	53.9	59.1
June	44.4	51.2	54.0	58.8
July	44.9	49.4	53.9	58.1
Aug.	45.2	48.3	53.9	57.7
Sept.	45.4	47.5	53.6	57.3
Oct.	45.3	47.5	53.4	56.9
Nov.	45.2	46.8	53.1	56.7
Dec.	....	45.8	....	55.9

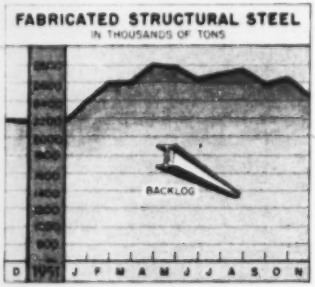
U. S. Office of Business Economics



Durable Goods Orders, Sales
In Millions of Dollars

	New Orders		Sales*	
	1951	1950	1951	1950
Jan.	15,050	7,570	10,430	7,092
Feb.	13,474	7,224	10,390	7,322
Mar.	15,542	8,611	10,851	7,679
Apr.	12,987	7,893	10,739	7,813
May	12,404	8,693	11,150	8,895
June	13,303	10,368	10,383	9,046
July	11,274	11,032	9,741	8,936
Aug.	11,046	14,305	10,052	9,902
Sept.	9,880	12,061	9,559	9,331
Oct.	11,584	12,220	10,700	9,756
Nov.	10,960	10,362	10,829	9,682
Dec.	.....	11,703	.....	9,869

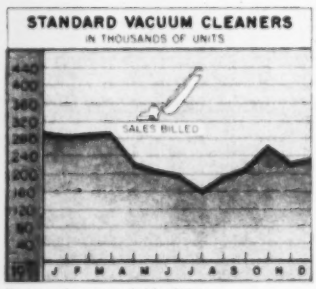
*Seasonally adjusted. U. S. Office of Business Economics.



Fabricated Structural Steel
Thousands of Net Tons

	Shipments		Backlog	
	1951	1950	1951	1950
Jan.	214.0	154.7	2,404	1,080
Feb.	193.6	149.8	2,590	1,025
Mar.	237.1	185.2	2,602	1,033
Apr.	234.1	187.8	2,808	1,023
May	234.5	194.8	2,771	1,107
June	257.1	202.4	2,636	1,242
July	264.4	165.5	2,688	1,456
Aug.	236.9	218.4	2,748	1,626
Sept.	228.3	198.7	2,580	1,794
Oct.	239.0	211.8	2,641	1,941
Nov.	218.2	193.8	2,438	2,188
Dec.	.....	212.9	.....	2,169
Total	.....	2,275.9	.....	.....

American Institute of Steel Construction



Standard Vacuum Cleaners
Sales Billed—Units

	1951	1950	1949
Jan.	282,305	249,150	228,769
Feb.	261,572	263,515	241,267
Mar.	290,242	361,014	309,897
Apr.	227,216	292,664	252,656
May	201,983	278,645	222,850
June	194,548	250,190	207,354
July	161,002	279,967	161,929
Aug.	191,299	344,232	219,909
Sept.	210,086	327,524	250,036
Oct.	259,469	331,445	272,520
Nov.	219,919	265,310	253,516
Dec.	230,263	288,756	265,513
Total	2,729,104	3,529,412	2,886,314

Vacuum Cleaner Mfrs. Assn.

Charts Copyright 1952, STEEL

Issue Dates of other FACTS and FIGURES Published by STEEL:

Construction	Dec. 10	Indus. Production	Jan. 14	Ranges, Elec.	Dec. 24
Employ., Metalwkg.	Jan. 28	Ironers	Jan. 21	Refrigerators	Dec. 24
Employ., Steel	Jan. 28	Machine Tools	Jan. 14	Steel Castings	Dec. 31
Foundry Equip.	Jan. 21	Malleable Castings	Dec. 31	Steel Forgings	Dec. 31
Furnaces, Indus.	Jan. 21	Prices	Jan. 14	Steel Shipments	Dec. 17
Freight Cars	Jan. 28	Pumps	Dec. 10	Wages, Metalwkg.	Jan. 28
Gear Sales	Dec. 17	Radio, TV	Jan. 21	Washers	Jan. 14
Gray Iron Castings	Dec. 31	Ranges, Gas	Dec. 24	Water Heaters	Dec. 24

stitute's estimate of production in the week ended Feb. 2 was set at 2,079,000 net tons of ingots and steel for castings, but floods in the Ohio river valley cut into that output. For STEEL's calculation of the national ingot rate, see p. 181.

Can't See Upturn . . .

Purchasing men are throwing cold water on predictions of a near-future business upturn. Although defense spending assures an eventual rise in industrial output, buyers don't expect a reversal of the downtrend in business activity for several months. A survey of members by the National Association of Purchasing Agents also shows further reductions in order backlogs but lower, better-balanced inventories. Employment, says NAPA, is down as members report more payroll separations, greater elimination of overtime and reduced workweek. Defense business still doesn't bulk large in the overall production picture—too much of it is still in the paper stage. Though military production and orders are reported rising, they still don't offset the loss of civilian business.

Machine Tools Needed . . .

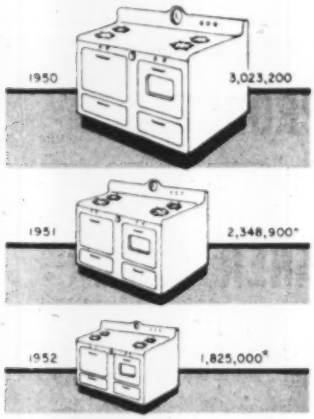
Even if machine tool builders operate at present production rates and no new orders come in, it would take a year and a half to clean up the backlog of unfilled orders. New orders are still coming in faster than shipments can be made, but the gap is being narrowed as new facilities and subcontracting programs add to turnout. National Machine Tool Builders Association Index for December pegged new orders at 416.8 (1945-1947 = 100) and shipments at 253.9; both were up from November. On a quarterly basis, new orders have tapered off since the first quarter of 1951; shipments in the fourth quarter jumped 38 per cent over the third quarter.

Workweek Lengthens . . .

Interruption of the downward slide of employment in consumer goods industries is indicated in latest figures from the Labor Department. Workweek of production workers in manufacturing

Gas Ranges: Fewer Burners Lit

(Annual Production—units)



† Preliminary. * Estimated. Source: Gas Appliance Mfrs. Assoc.

plants jumped to 41.2 hours in mid-December, from a mid-November average of 40.5 hours. In many consumer goods plants, workweek moved up more than the expected seasonal increase—the first such gain since last Spring.

Defense will cut deeper into the labor supply in the next few months as actual production gets under way. In the aircraft and parts industry, for example, employment has doubled since January, 1950, and is expected to reach 625,000 in April. To meet the manpower shortage, industry will have to make extensive use of workers 45 to 65 and older, says the Labor Department.

Railroads in the Red . . .

Railroads finished 1951 in the red as far as installing new locomotives is concerned. They put more into service than in any year since 1923, but at the same time retired more than ever before, leaving 1579 fewer locomotives in service going into 1952 than there were a year earlier.

Trends Fore and Aft . . .

Wholesale prices dipped to 175.9 per cent of the 1926 average in the week ended Jan. 22. The monthly comprehensive wholesale price index for December declined 0.3 per cent from November to 177.8 . . . Sales of all retail stores in December were estimated at $14.6 billion by the Commerce Department; that's 2 per cent below a year ago. For the year, total retail sales of $151 billion exceeded the the previous year by 5 per cent, but physical volume was down somewhat as price rises weren't accounted for . . . Industrial construction awards moved up to $94.3 million in the week ended Jan. 24.

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Output (per cent of capacity)[2]	99.5	97.0	100.0
Electric Power Distributed (million kwhr)	7,616	7,540	6,970
Bituminous Coal Output (daily av.—1000 tons)	1,687	1,960	1,863
Petroleum Production (daily av.—1000 bbl)	6,190†	6,196	6,041
Construction Volume (ENR—millions)	$309.3	$249.2	$308.3
Automobile, Truck Output (Ward's—units)	94,123	98,669	167,913
TRADE			
Freight Car Loadings (unit—1000 cars)	770†	748	784
Business Failures (Dun & Bradstreet, number)	142	158	193
Currency in Circulation (millions)[3]	$28,342	$28,526	$27,028
Dept. Store Sales (changes from year ago)[3]	−14%	−13%	+31%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$17,224	$16,633	$16,952
Federal Gross Debt (billions)	$259.3	$259.3	$256.0
Bond Volume, NYSE (millions)	$16.3	$15.7	$27.1
Stocks Sales, NYSE (thousands of shares)	9,202	8,339	12,779
Loans and Investments (billions)[4]	$74.2	$73.7	$70.4
United States Gov't. Obligations Held (billions)[4]	$32.3	$32.1	$32.6
PRICES			
STEEL's Weighted Finished Steel Price Index[5]	171.92†	171.92†	171.92
STEEL's Nonferrous Metal Price Index[6]	243.6	234.9	261.0
All Commodities[7]	175.9	176.5	181.4
Metals and Metal Products[7]	191.5	190.8	187.7

*Dates on request. †Preliminary. [2]Weekly capacities, net tons: 1951, 1,999,035; 1952, 2,077,040. [3]Federal Reserve Board. [4]Member banks, Federal reserve system. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1926=100.

NOW! foolproof bond for any product finish

DU-LITE'S PHOSPRAY

a cold spray bonding solution applied with ordinary spray equipment.

Phospray eliminates cleaning, rinsing, drying and other preliminary preparation.

Phospray dries "dust free" immediately, ready for application of final finish.

Phospray can be cut with thinner as high as 3 to 1 without reducing effectiveness.

Phospray has been thoroughly field tested to govt. specs. under conditions of humidity, salt spray, etc.

Phospray cuts processing time, reduces finishing costs, and provides an easy sure-fire bond for organic finishes on almost any metal.

Phospray is made and guaranteed by Du-Lite, the metal finishing specialists.

DU-LITE CHEMICAL CORP.
MIDDLETOWN, CONN.

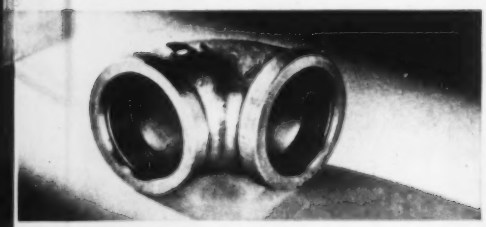
Send me a sample of Phospray . . . ☐
Send more Phospray information . . ☐
Have your representative call . . . . ☐

Name .....
Company .....
Address .....
City ..... Zone 2 ..... State .....

Du-Lite
METAL FINISHING SPECIALISTS

A PIPE FITTING MANUFACTURER had trouble with a straight cutting oil. It made the floors slippery; was suspected of causing skin irritations; discolored the fittings. In addition, a special cleaner and rust preventive had to be used.

CHANGING TO S.E.C.O. brought excellent results. This "Job Proved" emulsifying cutting oil kept the fittings from discoloring, minimized complaints about skin troubles, made floors safe, eliminated the need for a special cleaner and rust preventive.



OPERATIONAL DATA. Machine: 2" automatic tapping machine • Metal: Malleable iron • Operation: Thread and chamfer 1½" 45° elbow • Cutting Speed: 75 SFM • Tools: High speed • Production: 300 pieces per hour • Cycle Time: 11½ sec.

S.E.C.O. REPLACES THREE PRODUCTS; REDUCES COSTS, MAKES SHOP CLEANER, SAFER

Ten years ago, one of the largest manufacturers of pipe fittings was using a straight cutting oil that proved to be a production headache. It made floors slippery, discolored the fittings, even was blamed by the operators for causing skin ailments.

The company overcame these problems—with extra benefits for good measure—by changing to Sunoco Emulsifying Cutting Oil. S.E.C.O. performed as a quality cutting oil is expected to, and eliminated the need for two costly supplementary products: a special alkali cleaner and a rust preventive. Sprayed on the parts conveyed through the washers, S.E.C.O. left a film that gave complete protection against rusting. Oil costs were reduced to an amazing extent; floors were safe; complaints about skin irritations were minimized and shop morale improved. The pipe fittings, free of discoloration, commanded a better position saleswise. The company standardized on S.E.C.O. and has been using it ever since.

In all machine shop operations, on both ferrous and nonferrous metals, Sun Emulsifying Cutting Oil is definitely superior. That's why more S.E.C.O. is used than all other brands of emulsifying cutting oil combined. For more operational data on typical S.E.C.O. applications, write for a copy of the new "Cutting and Grinding Facts," Department S-7.

SUN INDUSTRIAL PRODUCTS

SUN OIL COMPANY, PHILADELPHIA 3, PA. • SUN OIL COMPANY, LTD., TORONTO AND MONTREAL

SUNOCO

Men of Industry

JOHN D. IVERSEN
. . . gen. supt. of Mesta Machine Co.

J. H. TREDINNICK
. . . exec. V. P. of Bliss Co.

GUY HUBBARD
. . . joins Bryant Machinery & Engineering

John D. Iversen was appointed general superintendent of **Mesta Machine Co.**, Pittsburgh, to succeed the late **John R. Berg.** He joined the company in 1935, and since 1945 has been assistant to the general superintendent.

Karl H. Dressel was promoted to field engineer for **Republic Rubber Division,** Lee Rubber & Tire Corp., Youngstown. He will have headquarters in St. Louis and will represent the company in Missouri in its line of belting, hose and molded and extruded rubber products.

Industrial Gear Mfg. Co., Chicago, elected **J. A. Sizer** as president. He was formerly vice president in charge of sales. Mr. Sizer succeeds **A. M. Scharek,** founder of the firm, who was elected chairman of the board and chief executive officer.

W. G. Smith, assistant superintendent of **Bethlehem Steel Co.'s** Lackawanna, N. Y., plant, was appointed assistant general manager. **J. E. Jacobs,** appointed two years ago, also serves in this capacity. **H. R. Knust** was appointed superintendent, mechanical department, Sparrows Point plant, succeeding **L. F. Coffin,** now assistant general manager.

Kenneth C. Towe was elected president, **American Cyanamid Co.,** New York. He succeeds the late **Raymond C. Gaugler.** Mr. Towe, a director, has been vice president-finance since 1945.

Extruders Inc., Hawthorne, Calif. appointed **William B. Sander** vice president and general manager.

J. H. Tredinnick, former vice president in charge of the Hastings, Mich., division, was named executive vice president of **E. W. Bliss Co.,** Canton, O. **Robert Shannon** was appointed the new manager at Hastings.

William B. Sherman was named sales manager of the Wahlstrom-Float Lock sales department of **American Machine & Foundry Co.'s** general products division. He formerly was assistant manager of the company's commercial research and development department. **Charles Wiedmann,** formerly sales manager of Wahlstrom chucks and tapper attachments, will assist Mr. Sherman.

Jack J. Levand, Ohio district manager of **Luria Bros. & Co. Inc.,** Philadelphia, was elected a vice president. He joined Luria Bros. in 1943 after operating his own business, Simon-Levand Co.

JACK J. LEVAND
. . . a V. P. of Luria Bros.

Guy Hubbard joined **Bryant Machinery & Engineering Co.,** Chicago, as assistant general sales manager. His responsibilities include advertising, publicity and sales promotional activities. He entered the machine tool industry in 1915 when he joined Windsor Machine Co., Windsor, Vt. He continued with its successor, National Acme Co., at Windsor and at Cleveland on machine tool design, sales promotion and eventually as advertising manager. Mr. Hubbard left National Acme to join Penton Publishing Co. as a technical editor, and for the last 13 years served as machine tool editor of STEEL.

Paul R. Ehrgott was appointed assistant to the resident vice president, and **J. W. Hardesty** as sales manager, Baldwin-Lima-Hamilton Corp.'s **Lima-Hamilton Division,** Lima, O. Mr. Ehrgott will also serve as sales manager in charge of all sales of shovels of 3 yards capacity and larger. Mr. Hardesty is in charge of domestic sales of all shovels and cranes up to and including 2½ yards capacity.

Rycenga Mfg. Co., Detroit, elected **Clifford W. Hoye** president to succeed the late **John Rycenga.** Mr. Hoye was formerly vice president-production. **Ervin J. Wilev,** formerly secretary-treasurer, was elected executive vice president and treasurer. **J. Lee Rycenga** was elected vice president-engineering.

Pennsylvania Transformer Co., Canonsburg, Pa., made the following changes in its sales assignments: **Dan E. Winslow Jr.** was transferred to the New York district sales office to replace **J. B. Sullivan,** returned

WILLIAM J. FISHER
V. P. director, Oliver Corp.

C. L. AUSTIN
. . . new president of J&L

MILTON J. WEBER
. . . V. P.-procurement, Frank G. Hough Co.

to headquarters sales in Canonsburg.

William J. Fisher, president of A. B. Farquhar Co., York, Pa., was elected vice president and director of **Oliver Corp.,** Chicago. **Edward H. Fisher,** who has been executive vice president of Farquhar, succeeds his father as general manager of the company, now a division of Oliver Corp.

Earl Mohr joined **Storms Drop Forging Co.,** Springfield, Mass., as vice president and assistant general manager. He formerly was with Atwater Mfg. Co.

J. S. Fluor was elected president, **Fluor Corp. Ltd.,** Los Angeles, replacing **D. W. Darnell,** now chairman of the board. **J. Robert Fluor** becomes executive vice president.

A. C. Louden, formerly vice president and production manager, **Louden Machinery Co.,** Fairfield, Iowa, was elected president. He succeeds his brother, the late **R. B. Louden.** New vice presidents are **W. L. Fry** and **R. W. Louden.**

Jones & Laughlin Steel Corp., Pittsburgh, elected **C. L. Austin** president replacing **Adm. Ben Morrell,** who remains chairman of the board. Mr. Austin, former executive vice president, joined J & L as treasurer and director in 1942. Admiral Morrell has been both chairman and president since 1947. Mr. Austin's former duties as executive vice president have been delegated to two men appointed to newly created posts: **A. J. Hazlett,** former vice president-sales, becomes executive vice president-distribution; **John B. Mitchell,** formerly vice president-operations, becomes executive vice president-production.

Robert T. Brunton was elected president, **G. W. Brunton & Son Inc.,** Buffalo. He succeeds his father, the late **G. W. Brunton.**

Charles W. Lee was appointed vice president - production, **Consolidated Western Steel Division,** U. S. Steel Co., Maywood, Calif. Since 1946 he has been vice president in charge of operations at the Orange, Tex., plant of U. S. Steel.

Frank G. Hough Co., Libertyville, Ill., appointed **Milton J. Weber** as vice president-procurement. He had been with J. D. Adams Co. before joining Hough. At Libertyville he took over control of the purchasing and priority functions for Hough. During the war he assumed various sales department duties in the absence of the sales manager, and supervised the parts department for several years.

Frederick W. Reynolds Jr. was appointed to the application engineering staff of **Sprague Electric Co.'s** New York office.

Dave Wallace was appointed assistant sales manager of **Cincinnati Lathe & Tool Co.,** Cincinnati. He formerly represented the company in the central states with headquarters in Chicago.

Donald E. Rice was appointed general superintendent of **U. S. Steel Co.'s** Torrance, Calif., plant replacing **Otto A. Kresse,** retired. Mr. Rice formerly was assistant general super-

A. C. LOUDEN
heads Louden Machinery Co.

CHARLES W. LEE
U. S. Steel V. P. Consolidated Western

DONALD E. RICE
. . . gen. supt., U. S. Steel's Calif. plant

DESIGNS AND BUILDS TOMORROW'S MACHINERY TODAY

EQUIPMENT CORPORATION

Wean

THE celebrated Cellini helmet has become a symbol of metal-working craftsmanship. For this reason we here at the Wean Equipment Corporation have chosen it as our trade mark.

For, like the talented Cellini, Wean works with metals—designing, engineering and building products that more than just meet accepted standards. Just as Cellini, Wean begins with a problem and finishes with a workable solution that satisfies even the most exacting critic.

Assembled behind the Wean name is perhaps the nation's leading staff of metal-working engineers—a group of creative men who make a practice of finding the proper solution to the toughest machine and equipment problems.

Wean is justly proud of these men and the records they have achieved—records that we feel have firmly established them as the metal-working craftsmen of our day.

WEAN EQUIPMENT CORPORATION
CLEVELAND . . . . OHIO

ADIN B. CAPRON
chief engineer, Babcock & Wilcox div.

ROBERT F. HODGSON
. . . Hydraulic Equipment V. P.

EARL W. CUNNINGHAM
. . . mgr. of GE's industrial heating dept.

intendent of the Pittsburg, Calif., plant.

Adin B. Capron was named to the newly created post of chief engineer, tubular products division, **Babcock & Wilcox Co.**, Beaver Falls, Pa. A number of engineering functions at both the Beaver Falls and Alliance, O., plants of the division have been centralized under the new position.

Fred H. Kroeger was made sales manager in charge of power brakes and devices for **Marvel-Schebler Products Division**, Borg-Warner Corp. at Decatur, Ill.

Cooper-Bessemer Corp., Mt. Vernon, O., appointed **T. M. Lamberth Jr.** to its Shreveport, La., office as sales and engineering representative.

F. L. Brewer was named purchasing agent of the Houston Works of **A. O. Smith Corp.** He succeeds **W. H. Coyle** who was transferred to a staff position.

E. C. Fisher was elected president of **Odin Stove Mfg. Co.**, Erie, Pa., succeeding **R. H. Hoffstetter** who becomes chairman of the board. **K. C. Hampel** becomes treasurer and general manager; **T. P. Dunn**, secretary; **E. K. Hampel**, general sales manager, and **A. E. Koch**, director of purchases.

Robert F. Hodgson was appointed vice president, **Hydraulic Equipment Co.**, Cleveland. Formerly sales manager and chief engineer, Mr. Hodgson joined the firm in 1945 as a sales engineer.

James P. Growdon, chief hydraulic engineer, **Aluminum Co. of America**, Pittsburgh, since 1938, became an engineering consultant on hydraulic and related engineering problems for Alcoa. He is succeeded by **B. J. Fletcher.**

James A. Hale succeeds the late **F. A. Olmstead** as district sales manager in charge of the Cleveland office of **Youngstown Sheet & Tube Co.**

National Electric Products Corp., Pittsburgh, appointed **Charles F. Meyer** assistant eastern regional manager, and New York district manager. He was vice president of Samson United Corp. before joining National five years ago.

Rudolph D. Silvern and **Henry N. Meyer Jr.** were added to the Chicago office force as sales engineers at **Hyatt Bearings Division**, General Motors Corp. **Harry J. Conlan**, assistant division engineer, eastern sales division, was transferred to the Pittsburgh office to a simular position for the central sales division.

Earl W. Cunningham was named general manager of **General Electric Co.'s** industrial heating department, Schenectady, N. Y. He became acting manager in April, 1951, when **Carl L. Ipsen** relinquished the managerial post to accept an advisory position with NPA. Mr. Ipsen has returned to the company as consultant in the industrial heating department.

M. W. Lyon was appointed sales manager, **Midway Tool Co. Inc.**, Melvin, O.

Fairbanks, Morse & Co., Chicago, announced an autonomous operation for two of its divisions—scale and electrical. The former will be headed by **George C. Worthley**, promoted from sales manager to general manager of this division, and **J. S. Peterson** becomes sales manager. **Gordon R. Anderson**, works manager of the Freeport, Ill., plant, where electrical products are manufactured, was promoted to general manager, electrical division. **W. H. Kingsley** is sales manager.

J. A. C. Armstrong was elected president of **S. A. Armstrong Ltd.**, Toronto, Ont., heating and materials handling equipment. **Miss D. H. M. Beach** is vice president-treasurer, and **Allan T. Jones** is general engineering manager.

OBITUARIES . . .

Herbert I. Dunphy, 65, assistant vice president, **American Car & Foundry Co.**, New York, died Jan. 23.

Jacob Morrison, 70, chairman of the board, **Morrison Steel Products Inc.**, Buffalo, died Jan. 22. He founded the Morrison Sheet Metal Works in 1912 and the firm was incorporated in 1920 as Morrison Steel Products. Mr. Morrison continued as president until he became chairman two years ago.

Charles F. Frantz, 52, chief estimator for **Lehigh Structural Steel Co.**, Allentown, Pa., died Jan. 17.

J. C. Nelson, 67, retired president and chairman of the board, **Easy Washing Machine Corp.**, Syracuse, N. Y., died Jan. 23. He retired in 1950.

Carl E. Dugger, 52, superintendent of the percussion division of **Chicago Pneumatic Tool Co.** plant in Utica, N. Y., died Jan. 23.

Morrison G. Cain, 65, chief engineer, **Dobbie Foundry & Machine Co.**, Niagara Falls, N. Y., died Jan. 24.

FACTS TELL THE STORY...

NEW CK MILLING MACHINE CUTS PRODUCTION TIME 75%

C-K MILLING MACHINE FEATURES THAT HELP DO THIS JOB BETTER

New CK column easily absorbed vibration from heavy cutting load.

Greater horsepower permitted maximum results from modern cutter.

24 different spindle speeds (13 to 1300 rpm) plus 32 different table feeds (3/8" to 90" ipm) meant operator selected proper combination to take full advantage of high horsepower and modern tools.

CK's 3 bearing spindle and flywheel assured fast metal removal, excellent finish.

CK's large (2" dia.) table feed screw gives greater bearing contact for smoother feed.

CK's positive, metered lubrication assures trouble-free operation.

The FACTS on this job are:

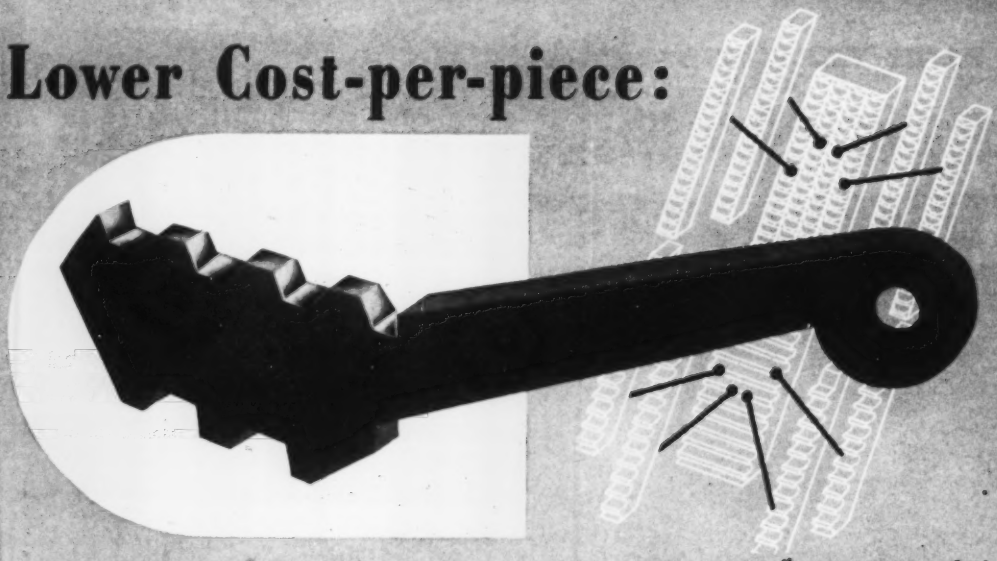
Operation: Face mill four sides
Workpiece: Ram for slotting attachment
Material: S.A.E. 4615 forging — 2¼" x 2¾" x 18½"
Machine: New 25hp No. 4 CK vertical
Cutter: 6" dia. 48 Tooth Carbide Face Mill with 7° negative primary rake angle.
Cutter Speed: 275 rpm **Depth of Cut:** ¼"
Table Feed: 25 ipm **Machining Time:** 3.8 minutes
Total Saving in actual machining time: 11.9 minutes or 75.8%

NOTE: Part machined is the operating ram used in a slotting attachment. It must be tough and accurate. It is milled to a semifinish state and finish ground to final accuracy.

It will pay you to see the new CK line of milling machines — check them against your own requirements. You'll notice how every feature is designed and job-proven to give you cost-cutting results — greater machine capacity, productivity and better finished products. So, for the full story, contact your nearest Kearney & Trecker representative or write: Kearney & Trecker Corp., 6784 W. National Avenue, Milwaukee 14, Wisconsin.

KEARNEY & TRECKER MILWAUKEE MACHINE TOOLS

Lower Cost-per-piece:



BROACH REDESIGN *cuts tool costs* $530.00 *saves on maintenance, too!*

The original tooling to produce the forms on the above part incorporated each contour in a solid broach. Detroit Broach engineers recommended "breaking up" each form into individual inserts as well as rough and finish sections. The result was an immediate saving of $530.00 per set of tools. While the rate of production remained the same, the smaller size and simplified form of each insert made tool sharpening costs drop substantially. Further, if some part of the form was damaged, only one insert, either "rougher" or "finisher"—not an entire form broach—needed replacement.

These are typical savings that can be had when broaching tools are studied by qualified specialists with an eye toward production efficiency . . . toward lowest cost-per-piece. Detroit Broach engineers *are* such qualified experts since they work with the design and manufacture of broaches and broaching tools exclusively. Whether your problem is a new broaching application or boosted efficiency from a present broaching job, why not get Detroit Broach to look in?

DETROIT BROACH CAN CUT YOUR COST-PER-PIECE

by

1 Developing broaching set-ups to replace other, more costly machining methods.

2 Redesign present broaches and broaching set-ups to make them more efficient.

WORLD'S LARGEST MANUFACTURER OF BROACHES AND BROACHING TOOLS EXCLUSIVELY

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Production AND Engineering
NEWS AT A GLANCE

THEY DO IT WITH MIRRORS—Timken has a machine that will measure smoothness of a highly polished steel sphere or cylinder accurately to within a millionth of an inch. Surface of the object to be measured is mounted on a flat table fitted into a special bearing. A sensitive hinge is mounted just above the specimen. At the end of this hinge is a diamond needle and a tiny mirror. The diamond needle traces lightly over the specimen's surface as the complete table upon which the specimen is mounted turns. As the needle rides over the surface, any variation in that surface wiggles the needle and mirror. A tiny light beam played on the mirror moves as the mirror moves. Through a series of other mirrors, the light beam is transmitted onto a photographic film and the variations on the surface of the object being measured are recorded on a circular film. By changing length of light beam, surface variations can be magnified up to 5000 times their actual size.

ALUMINUM SHEATHED COAXIAL—Coaxial cable using aluminum as an outer conductor and sheath is on the market. Built for microwave uses, the cable has a central conductor held in the exact center of the outer sheath and conductor by a spiral of interior insulation tape which occupies about 12 per cent of the space, the rest being air dielectric. Insulation is built up of hundreds of extremely thin Styroflex (a flexible form of polystyrene) tapes wound on by a precision taping machine. The cable is completely without reflections which cause ghost images in television and distortion in communications.

WOOL CUTS METAL—Felt in a wide range of thicknesses and densities is being used extensively in metalworking plants for precision grinding, polishing and buffing. Deep drawing dies, combustion chambers, lipstick holders, darning needles are some of the wide variety of products given a final surface finish by felt bobs or wheels. Successful use of belt wheels depends upon selection of wheels of uniform texture and suitable density, fabricated from quality wools. p. 88

GOODBYE ELECTRON TUBES—A tiny cadmium sulphate crystal that amplifies one-million times may be the heart of a new system for high-speed automatic industrial x-ray inspection. The crystals, which can be grown from a fraction of a millimeter to several millimeters, act as amplifiers when they are excited by x-radiation. On an area-for-area basis, they are up to a million times more sensitive than conventional ionization chambers and a thousand times more sensitive than photoelectric cells. The crystals do the work formerly handled by a complex system of electron tubes and amplifiers.

OUTPUT POTENTIAL HIGHER—"Warehouse with manufacturing facilities" describes Lincoln Electric Co.'s new welder and electrode plant. Scientifically planned, the facility has an output potential 50 per cent higher than the old plant and lower direct and indirect costs. And all this with no more personnel or equipment. There is no parts storeroom, no goods in process inventory and no finished goods warehouse. Finished welders go direct from assembly lines to waiting freight cars and trucks. p. 92

HARDENABLE PEWTER—Modification of pewter which is considerably harder than ordinary pewter in cast form but which softens during rolling into sheet was recently discovered by the Tin Research Institute. The new metal can be spun or hammered and then fully hardened by heat treatment. It contains 1½ per cent bismuth in addition to the usual proportions of antimony and copper—6 and 2 per cent respectively.

DIESEL BEARING ALLOY—Casting techniques are now improved to permit volume production of high lead copper-lead bearings of uniformly good quality. Developed for low speed diesels, the bearing is a low carbon steel backed type lined with a 60 per cent copper, 40 per cent lead mixture. The copper-lead bearing surface is overplated with a lead-tin alloy to a thickness of 0.001 to 0.002-inch. p. 94

TEST, DON'T BUILD—Performance of a proposed motor design that would ordinarily require a week to calculate is determined in less than a day with an analog type computer. The Westinghouse testing device is proving of great benefit in designing fractional-horsepower, single-phase motors. Now a designer can explore the design in far more detail than would otherwise be justified or that he would have patience for. The computer can show the effect of changing a single variable better than actually building two machines and testing them—and will do it in minutes instead of months.

INHIBITS DEZINCIFICATION—Bridgeport Brass reports addition of 0.04 per cent arsenic to Admiralty brass aids in inhibiting dezincification in sea water and also lowers slightly the overall corrosion rate. Added to Muntz metal, 0.10 per cent arsenic markedly inhibits dezincification in sea water. This concentration of arsenic has an effect almost equal to that of 0.5 per cent tin.

Metalworking Outlook—p. 51 *Market Outlook—p. 181*

Felt for Finishing.. Metalworking Applications Expand

By LEON D. GRUBERG
The Felt Association
New York

INDUSTRIAL applications of felt are increasing. Not all current output of felt goes into billiard table tops or toppers for the population. Much of it is used in the metalworking industry for precision finishing, grinding, polishing and buffing. Felt for such applications is made in a wide range of densities and thicknesses and varies from gossamer softness to rock-hard. For polishing relatively soft materials the hornlike character of the wool fiber permits use of hard felts for polishing, with no additions or supporting agents. For harder materials felt wheels need abrasive agents. Then wheels act as carriers for liquids in which abrasive substances are dispersed. About 85 per cent of felt wheels used for surface polishing are set-up wheels, coated with glue and rolled in selected grits to form an abrasive tool, similar to the emery wheel.

In buffing operations the felt wheel, coated with a grease compound, bears rouge, tripoli or some other substance. Wheel has no abrasive coating, is conditioned by pressing a stick or cake of the compound against the revolving surface.

Standards—Mechanical sheet felt is subject to rigid standards and specifications for metallurgical finishing and polishing operations. The standards cover four classes of sheet felts: Fine Spanish, Spanish, fine Mexican and coarse Mexican. First two are fine while the latter are coarser fibered varieties. Each type offers five different degrees of density: Extra soft, soft, medium, hard and rock-hard. These densities are distinguished by numbers—12, 16, 20, 26, and 32—designating the weight in pounds of a standard sheet of felt 1 inch thick.

Sheet felts have many technical uses. Extra soft Mexican type polishes aluminum, copper, zinc and plastics, also wipes sheet steel. At the other end of the density range, extra hard, fine Spanish sheets get cut, then turned into wheels and bobs for grinding and polishing metals and other materials.

Applications in Metal Finishing—Deep drawing dies, combustion chambers for automotive engines and such diverse products as lipstick holders and darning needles obtain a final surface finish from felt bobs or wheels.

In polishing metal cylinders, Spanish sheet felt strips are inserted in metal channels so edge grain of felt does the polishing. Spanish sheet felt is used because it is hard, has plenty of life and readily holds grinding or polishing compounds. For precision polishing of propeller blades, extra hard Mexican sheet felt backs up Carborundum abrasives. Cutlery is placed between rollers of Spanish sheet felt with fine pumice the polishing medium.

Chromium plated automobile parts, often become contaminated with body paint and require cleaning and polishing. Backcheck felt, a mechanical roll felt, rather than sheet felt finishes these parts. An extra firm, lint-free felt it can be readily cleaned with solvents. Backchecks are also used for wiping, and for cleaning metals prior to plating. Punched backcheck plugs, lubricated with wax preparations, are blown through tubing by compressed air to clean the inside. Rock-hard felt bobs work for the aviation industry finishing connecting rods, cams, oil holes and other parts having irregular contours.

Finishing Aluminum—Felt provides a variety of mechanical finishes for aluminum. Finish may be a decorative effect, on preparation of the surface for other finishes. Grinding with a bonded abrasive cup wheel or canvas wheel faced with 25 to 50 grit abrasives removes surface variations from aluminum castings. Peripheral speed is approximately 600 fpm. Higher wheel speeds overheat work, lower speeds may loosen abrasive.

Wheels or belts bonded with finer abrasives having a more gentle cutting action, polish aluminum. Wheel to metal pressure is lower. Polishing operations include roughing, greasing or oiling, buffing and coloring. Roughing prepares aluminum for subsequent polishing. These wheels are faced with 50 to 100 grit abrasives and run below 6000 fpm to avoid ridging or heating.

Greasing or oiling is a refined roughing procedure done with a felt wheel faced with 100 to 220 grit aluminum oxide emery, a lubricant to prevent overheating. Sand castings get this treatment after roughing, die castings after the first polishing operation. Tripoli powder with a grease binder becomes the abrasive for buffing. For coloring—the high gloss or luster on aluminum surfaces, change is made to open muslin buffs with soft silica abrasives embedded in grease. Wheel speed goes up to 8000 fpm. Light work-to-wheel pressure is used.

Finishing Copper—Copper gets a mirror-like finish with fine and relatively soft abrasives, such as rouge (red ferric oxide), crocus

Developments in the felt industry indicate more than one way to finish ferrous and nonferrous metals. Felt wheels and bobs have a multitude of uses

(purple ferric oxide), tripoli or lime on a wheel of felt or other soft material. Buffing compound is abrasive mixed with stearic acid and tallow and formed into a bar or cake. This is pressed against the revolving felt wheel. Liquid polishing and buffing compounds may be sprayed on the wheel eliminating wastage caused by stubs. Liquid preparations permit faster, better control of the abrasive; are well suited for automatic machines. Recent improvements are ventilated buffs, which eliminate scorching and burning, and buffs which do not ravel. Pleats form pockets to hold the abrasive.

Armco Steel Corp. uses felt wheels to polish No. 7 grade of stainless steel commonly called the mirror finish. Crucible Steel Co. uses felt for buffing No. 8 stainless steel sheet. At United States Steel Corp. Spanish felt belt of 100 per cent pure white wool buffs stainless steel sheets to a high polish; sheets that have previously been ground by grits of varying fineness.

Making Bobs and Wheels—All felt polishing wheels and bobs have one thing in common—nothing goes into them but wool and work. Manufacturing process involves hardening and fulling, a mechanical process of kneading wool under controlled conditions of heat, pressure, moisture and lubrication.

Batts harden by agitation under pressure while in a warm, moist and slightly acidified condition. Individual fibers become closely entangled, forming an integrated mat of uniform texture. Fulling shrinks the hardened blank by persistent tumbling and pounding in a hammer mill. Density increases to the point of solidification simply by impact that drives fibers closer together. Adhesives are never used.

After fulling, wheels are straightened, hot pressed to the required thickness and seasoned in an oven to bone dry condition. Then they are bored and turned to diameter, trued and balanced.

Setting Up and Care — A felt wheel is "headed" or set up with a fixed abrasive coating by impregnating the circumference with a glue or resin and then rolling it in abrasive. Application of grease, tripoli or other compounds moderates action of the abrasive on grease wheels. Greaseless wheels have a compound containing the abrasive applied directly to the surface.

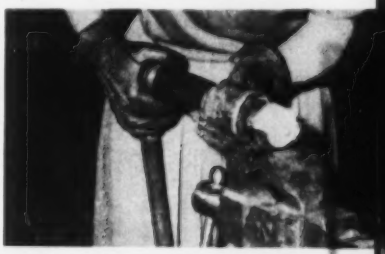
Successful use of felt wheels depends upon selection of wheels of uniform texture and suitable density, fabricated from quality wools. Next is the correct choice of abrasives, and finally, the utmost care in setting-up. The wheel should be sized well with thin glue and allowed to dry, then finished with lump pumice to remove surplus sizing and glue. Wheel is ready for applying bonding glue and grains.

Wheel, glue and abrasive grains should all be warm. A first run hide glue, in full layer, at 140° F should be applied evenly. Some abrasive grains absorb both water and glue. These must be worked thoroughly into the glue and be completely covered by it, otherwise grain quickly wears away.

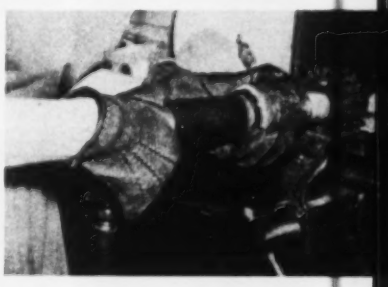
Use of cement in bonding grains has increased because of its easy application, low cost and quick drying at normal room temperature. Cement, however, should not be used for fine or very fine opera-

(*Please turn to Page* 110)

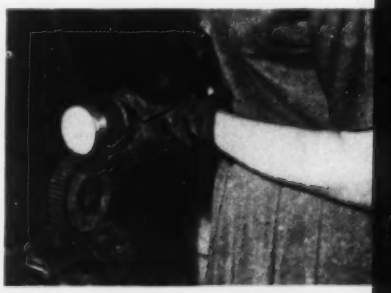
Finishing outside of a connecting rod with hard felt cone. Cone is turned on a lathe for shape that fits contour



Small wool felt wheel is used to polish inside of connecting rod bearing cap



Precision gear's center bore gets finish polishing with hard felt bob



Knife-edge wool felt wheel is used for finishing surface of gear teeth

STAMPINGS FORMED FASTER

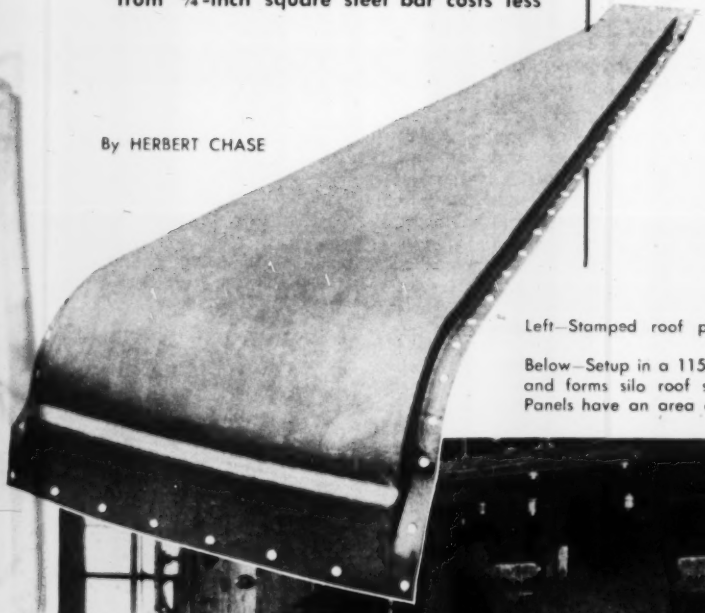
Roof panels, 17 sq ft in area are drawn from 0.070-inch steel and later glass-surfaced on both sides. A tractor part sheared from ¾-inch square steel bar costs less

By HERBERT CHASE

UNUSUAL stampings produced by Leake Stamping Co., Monroe, Mich., are 17 sq ft silo roof sections, drawn from 0.070-inch SAE 1010 vitreous enameling steel. These sections are glass surfaced on both sides and assembled as part of air-tight silos.

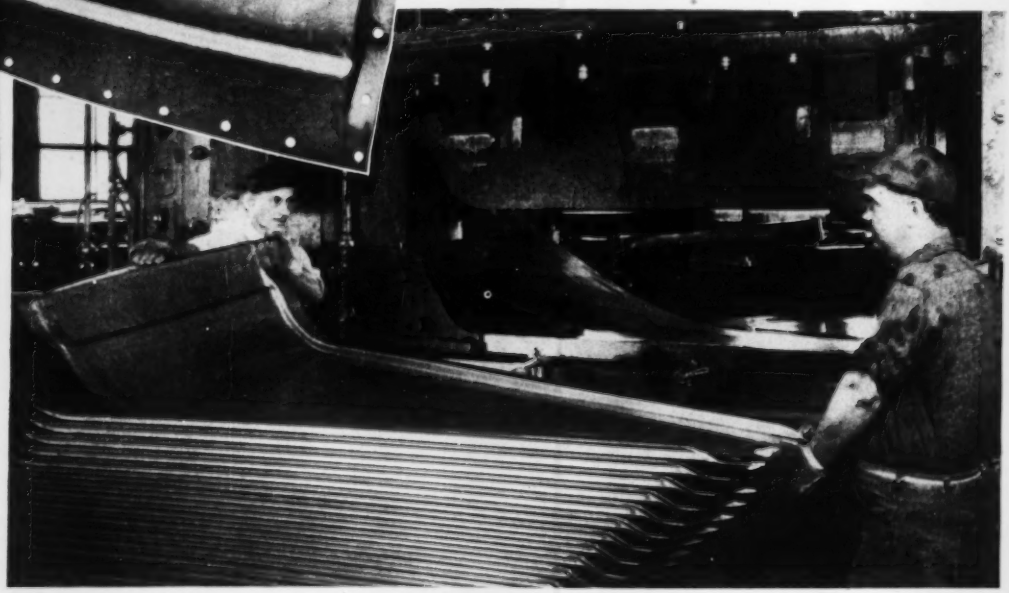
Channel Section—After square shearing to make 50-pound blanks, the blanks are fed through a 1150-ton Clearing hydraulic single-action press to make the draw that results in a channel-like triangular section. At the same stroke, one end of the inverted part is turned up and a step is formed just above the bend. Bolt holes around the perimeter of the panel are provided for accurate assembly of adjacent sections to the side panels to form a roof, that not only is tight but that drains properly.

A water soluble draw compound facilitates thorough cleaning essential to the application of the glass surface. Following the draw, wide end of the workpiece is trimmed in a hand shear, after



Left—Stamped roof panel after drawing, trimming, piercing

Below—Setup in a 1150-ton Clearing hydraulic press that draws and forms silo roof sections, foreground, in a single stroke. Panels have an area of about 17 sq ft and weigh 50 pounds



which the remaining contour is sheared in a die that also pierces holes for fastening bolts. The finished piece has a projected length of about 77 inches. Ends measure approximately 37 and 9 inches respectively.

Tractor Part Stamped—Another interesting stamping is a part for a crawler type tractor. Because of severe service conditions, the part was formerly forged. Now, since two faces are flat and parallel and contours can be sheared to yield the desired shape, this part is now produced as a stamping from SAE 1025 steel, with some saving in cost over a forging.

Although this stamping conversion would ordinarily present a problem because the width is considerably thinner than the metal thickness, Leake engineers found it unnecessary to consider blanking the part in its entirety from ¾-inch plate. Using a ¾-inch square bar in mill lengths, it is possible to shave selectively and part the bar in a manner which requires cutting only a little more than half the entire contour of the stamping. Four different sizes of core strips are currently in production using this method.

The stamping is a bar-like piece but has its ends radiused and is cut away to about two-thirds its original thickness between these ends. Punch and die hole have the same contour as the blanked piece, but shearing takes place only around the radiused ends and between them on one side of the piece. On the opposite side, no shearing (except at the radiused ends) is required because that face is formed by one flat face of the original bar.

Top and bottom faces flattened to a given thickness do not have to be machined. With the forging, the ends have at times required spot facing in addition to the drilling of assembly holes. Rate of production of the stamping is approximately 400 per hour. When compared with other methods of manufacture the stamping presents a very attractive labor and material cost comparison.

In the stamped part, three faces retain the smoothness of the original hot-rolled bar. The sheared contour has the characteristic appearance of any sheared face and meets the customer's requirements.

Setup for shearing core strips in a 350-ton press from ¾-inch square steel bars in mill lengths

Core strips. Left, original forging. Right, stamping produced from ¾-inch bar

Coke Consumption Rate Determines Furnace Charges

GOOD COAL is a requisite for good coke and, in turn, good coke is a requisite for a good coke rate in the blast furnace. Speaking before a meeting of the Blast Furnace and Coke Association of the Chicago District at the Del Prado Hotel, Jan. 25, R. V. Flint, chief industrial engineer, and J. J. Kulesz, industrial engineer, department of standards, United States Steel Corp., Pittsburgh, enumerated and analyzed the "factors affecting blast furnace coke rates."

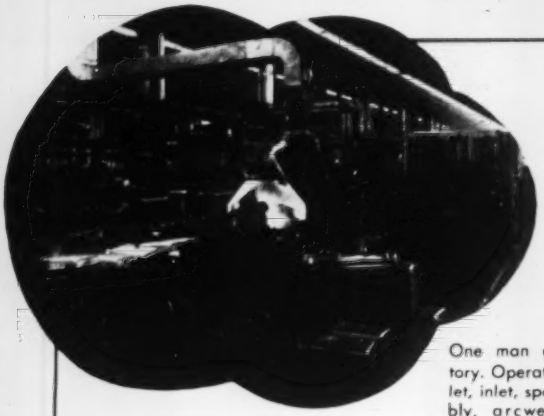
Mr. Flint referred to the current shortages of metallics, scrap and hot metal, and asserted that coke rate is the most important means for getting high blast furnace output. At the same time, coke is the most expensive raw material charged into the stack.

The four principal factors bearing on coke rate are: Chemical and physical properties of the coke, metallic burden in the stack, product being made, and operating practice and furnace design characteristics. Properties of the coke itself affecting coke rate are ultimate carbon content; ash content; sulphur content; and physical characteristics. Effective carbon equals the ultimate carbon minus carbon for ash minus carbon consumed in sulphur elimination. For the fuel considered in the discussion, effective carbon was 71 per cent.

The investigation pursued by the authors over a long period indicated that coke consumption rates could be calculated and used as yardsticks. For example, fines in the metallic burden require 4 to 6 pounds of effective coke per 100 pounds. For each 100 pounds of scrap in the burden, effective coke is reduced 40 pounds; 100 pounds of sinter gives a 9-pound decrease in coke rate; 100 pounds increase in open-hearth cinder nets a 10-pound decrease in coke requirements; and a 7-pound coke decrease is accomplished from each 100 pounds of roll scale charged.

When all plus and minus factors were consolidated, it was found that for the specific blast furnace conditions stated, effective carbon requirement per ton of hot metal was 1222 pounds. Translated into coke weight, this represented 1720 pounds per ton of hot metal.

Yardsticks which the authors have developed have been used by the company's blast furnace operators for some time and have proved helpful in determining coke charges in relation to other raw materials making up the burden.



One man gas tank factory. Operator solders outlet, inlet, spotwelds assembly, arcwelds circular seam, then tests tank

Planned to Produce . . .

New Plant Ideas Pay Off for Lincoln

With no additional personnel, machinery and equipment, company gains 50 per cent increase in output potential over old plant, reduces direct and indirect costs

By ROBERT E. HALL
Assistant Editor

DREAM of production men is that miracle of efficiency — a plant where material is processed in a straight line from receiving dock to shipping with no lags, no bottlenecks. To them, Lincoln Electric Co.'s new plant in Euclid, O., might seem like that dream come true, with improvements added.

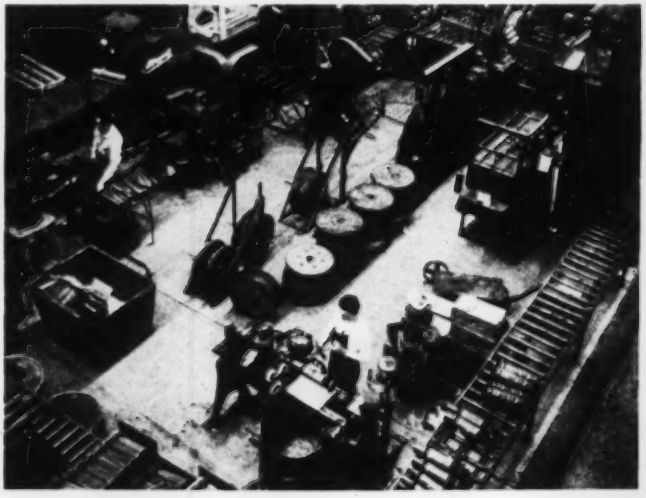
Rather than a production miracle, the plant is result of careful, scientific planning. Long before plant entered the drawing board stage methods and procedures were studied in plants throughout the country by President J. F. Lincoln. Then a section of the old plant was re-layed out as a pilot plant for testing revolutionary ideas planned for the new building.

Results Impressive—Even with physical limitations imposed by the unsuitability of the old structure, both direct and indirect labor costs were cut 10 per cent. Transferred to directly productive work were 34 persons formerly kept busy keeping paperwork or moving materials.

First and foremost, the new building aims at further reduction of costs. Every feature of its design is motivated by ways and means to pare indirect costs and give workers more productive time, less lost motion. There are no unnecessaries. Company estimates many innovations of the plant in-

Storage of subassemblies on roll-down conveyors provides easy access at point of use on welder assembly line

Self-contained manufacturing area typical of many throughout the plant has all facilities necessary to produce armature subassemblies at point of use adjacent to assembly line—machinery, raw materials and inspection devices



crease output potential of the old plant by 50 per cent, with no additional personnel or equipment. And there is room for expansion.

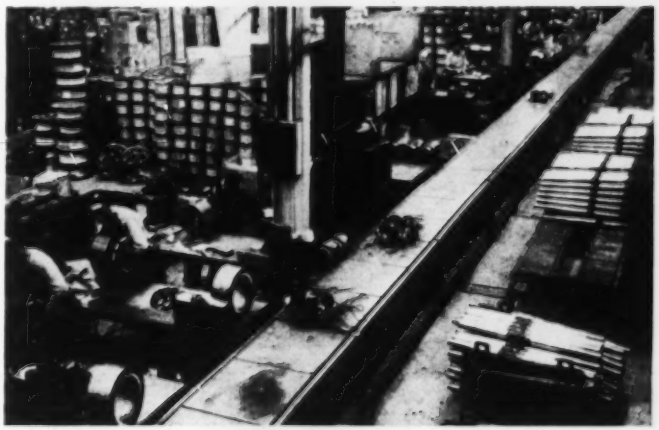
No Stockroom — J. F. Lincoln terms the plant a "warehouse with manufacturing facilities." There is no parts storeroom, no goods in process inventory, no finished goods warehouse. Welders go direct from assembly line to waiting trucks and freight cars. Materials handling is minimized. Mountainous paperwork required for production and stock control is eliminated. Raw materials go from the receiving dock direct to point of use, are spotted in reserved areas on the floor. No material is placed anywhere but its intended location. A walk down the aisle gives inventory information at a glance.

Subassemblies for welders are made at point of use in self-contained subassembly departments. These are, in reality, small factories where all operations required to produce the subassembly are performed. An operator usually performs several operations. He may machine a component, then paint it. He is his own inspector, solely responsible for the proper functioning of each piece he produces.

No Aisle Movement—Roller conveyors move components to subsequent operations though only a few feet away. Most material handling within a bay is by overhead crane which permits narrower aisles, more productive use of floor space. Pallet-type conveyors running from north to south in each bay handle material in direction of flow. To facilitate handling and

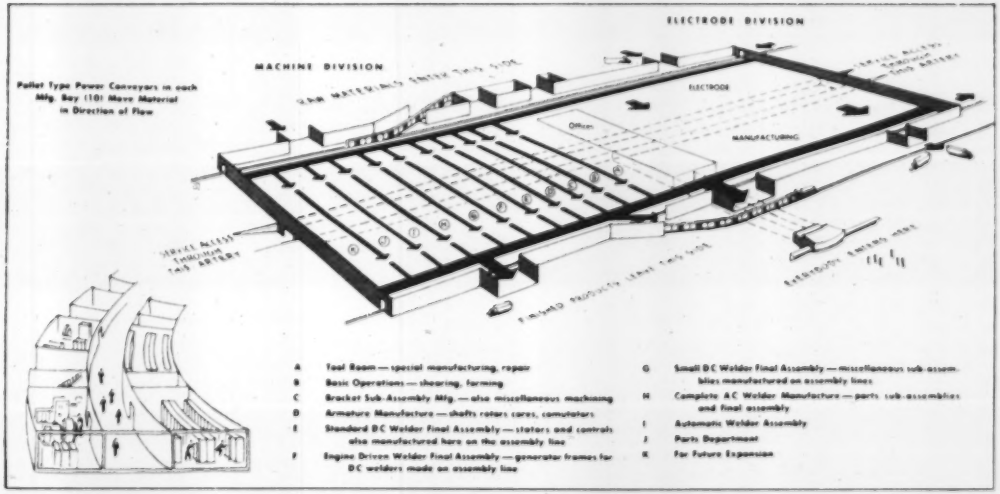
(*Please turn to Page* 112)

Trucks or freight cars can be spotted at any point along 1400-foot receiving dock. Material goes by overhead crane directly to the point of use



Coil and stator winding. Pallet-type conveyor shown in center moves material, subassemblies in direction of flow

Blueprint for production efficiency. All employee facilities are in an underground tunnel running the 1400-foot length of the plant. Entire plant floor is free for manufacturing. Convenient stairways place most distant employee no more than 200 feet from his locker


ELECTRODE DIVISION
MACHINE DIVISION
Pallet Type Power Conveyors in each Mfg. Bay (10) Move Material in Direction of Flow
ELECTRODE
MANUFACTURING
Offices
A Tool Room — special manufacturing, repair
B Basic Operations — shearing, forming
C Bracket Sub-Assembly Mfg. — also miscellaneous machining
D Armature Manufacture — shafts rotors cores, commutators
E Standard DC Welder Final Assembly — stators and controls also manufactured here on the assembly line
F Engine Driven Welder Final Assembly — generator frames for DC welders made on assembly line
G Small DC Welder Final Assembly — miscellaneous sub-assemblies manufactured on assembly lines
H Complete AC Welder Manufacture — parts sub-assemblies and final assembly
I Automatic Welder Assembly
J Parts Department
K For Future Expansion

HIGH LEAD COPPER-LEAD

BEARINGS

DEVELOPED FOR SLOW SPEED DIESELS

By ALBERT WILLI Jr.
Assistant Chief Engineer
Federal Mogul Corp.
Detroit

EXPERIMENTAL tests on copper-lead bearings indicate a 40 per cent lead content is suitable for use on unhardened shafts having a Brinell range of 180 to 200. This opens a field of application in large, slow speed diesel or gas engines which, for economic reasons, are built with unhardened crankshafts.

The copper-lead bearing most popular today in high speed, heavy duty engines contains lead in the range of 20 to 30 per cent with the balance copper. To obtain optimum performance, shafts are induction hardened or nitrided. To further improve the compatibility between bearing and shaft, copper-lead bearing surface is coated with a precision electrodeposition of a lead-tin alloy, usually 0.001-inch thick.

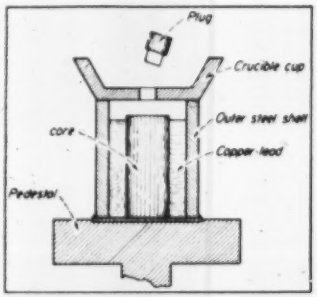
Copper and lead are insoluble in each other and their melting points differ by 1360° F. These conditions make it difficult to cast a copper-lead mixture and obtain uniformly good dispersion of the lead in the copper matrix when the lead content exceeds 30 per cent.

Methods Improved — Improvements in establishing casting technique now permit volume production of high lead copper-lead bearings of uniformly good quality.

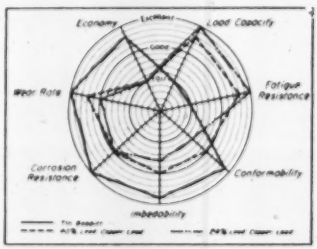
In the casting process a bottom sealer plate is welded to the bottom of the outer steel shell. The outer shell eventually becomes the bearing back. Into the cup is assembled either a carbon or steel core and on top of it is placed a tight fitting reusable crucible. The entire assembly is then placed in a neutral atmosphere furnace at about 2000° F during which time the oxygen is burned out of the rough assembly cavity.

When the assembly reaches the proper temperature, it is removed and placed upon a pedestal projecting out of a high turbulence water tank. Molten copper-lead is poured from an induction furnace into the crucible cup. Once the cup is full, the plug is removed and the melt runs down between the core and the outer shell. The assembly is then lowered at a predetermined rate into the water tank, quenching severely to obtain the desired microstructure. After removing the crucible, machining off the sealer plate, and boring out the core, the lined tube is ready for conventional machining into a bearing.

Most successful bearing is a low carbon steel backed type lined with a 60 per cent copper, 40 per cent lead mixture. The copper-lead bearing surface is overplated with a lead-tin alloy, containing 8 to 12 per cent tin, balance lead, to a thickness of 0.001 to 0.002-inch.



Gravity cast copper-lead assembly



Comparative requisite ratings for tin babbitt, 24 per cent lead and 40 per cent lead copper-lead bearings

Better Load Capacity—The 40 per cent lead type strikes a mean between tin babbitt and 24 per cent lead copper-lead with regard to these bearing qualities. Probably the most striking improvement over the babbitt is its increased load capacity and fatigue resistance. To obtain these advantages, we suffer somewhat in conformability, imbedability, and wear rate. However, this sacrifice has not proved detrimental. The improved qualities are obtained at an increase in cost as evidenced by the economy rating.

Individual requisite rating for 40 per cent lead copper-lead bearings is shown in one of the charts. The following discussion of each requisite is based upon observations of performance data. Data on seven different engines, ranging in bore from 8 inches to 16 inches, were available. Included were one 2-cycle and five 4-cycle diesel and one 4-cycle gas engine.

Representative load figures show a maximum crankpin bearing load of 1950 psi of projected bearing area with a mean of 585 psi. Main bearing loadings ran 1300 psi maximum with a mean of 425 psi. Under these loadings, shaft speeds ranged from 327 to 1150 rpm.

These loads do not represent maximum permissible values. Test rig figures showed satisfactory performance up to 3000 psi at 1500 rpm, which was the limit of the machine; but based upon actual engine tests, it is estimated that the limiting load would tentatively be set at 2500 psi.

Fatigue Resistance—This quality is far superior to that of babbitt.

From data presented by the author at the SAE annual meeting, Detroit, Jan. 14-18.

NEW LINCOLN PLANT CREATED BY INCENTIVE-INSPIRED CO-ACTION IN DEVELOPING POSSIBILITIES IN PRODUCT

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PROPER DESIGN IN WELDED STEEL IMPROVES PRODUCT . . . cuts costs for Hanson-Van Winkle-Munning

THE examples show how one prominent manufacturer has improved the quality of his products while cutting costs by converting to welded steel design.

When designing for efficient welded steel construction, savings in initial material cost alone generally average 85% to 95%. This is because steel costs less per pound. And with steel's greater strength and rigidity, fewer pounds of metal are needed. In many cases, machining operations required for iron can be minimized or eliminated entirely.

Where product designs utilize the economies of welded steel, cost analyses show that:

1. Material costs for steel generally range from 5% to 15% as compared with castings.
2. Labor costs for fabricating steel are about 30% of initial casting purchase costs.
3. Welding costs average 50% of total labor costs for fabricating steel.

If your costs do not approximate these averages, your product designs should be reappraised. A Lincoln Welding Engineer will gladly point out what benefits of welded steel may have been overlooked.

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Fig. 3. Welded steel *saves 30% cost . . . cuts weight 50%. Design is simpler . . . plain channel replaces complicated casting.*

Fig. 4. Stronger, more rugged machine part *results when fabricated from steel strip and standard channel. Weight is cut from 3 lbs. to 2 lbs. 4 oz. Cost of this small part is 12% less.*

ORIGINAL CONSTRUCTION

Fig. 1. Machine bracket *for* **Hanson-Van Winkle-Munning,** *Matawan, N.J. weighed 50% more than present steel design. Casting had to be left heavy for strength in hub and arm. Design made efficient use of cast iron by providing cored slots. Casting required milling and drilling.*

PRESENT WELDED STEEL DESIGN

Fig. 2. Finished weldment *costs 25% less . . . eliminates former breakage experienced in casting. Steel hub, cut from bar stock and pre-drilled, is welded to simple formed steel arm in which holes are pre-punched.*

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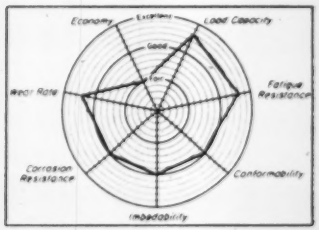
No bearing metal breakdown or cracking due to fatigue is reported in 13,000 to 17,000 hours. Babbitt bearings in these same engines began fatigue cracking in 5000 to 8000 hours and some approached the danger point at 9000 hours.

An interesting comparison developed in a stationary diesel which was involved in an accident that damaged one crankpin. To keep the engine on the line, it was necessary to hand finish the crankpin 0.010-inch undersize. As the hand finishing wasn't very accurate, the pin ended up with 0.004-inch taper. Since it was originally equipped with babbitt bearings and no 0.010-



Requisite rating for 40 per cent lead copper-lead bearing

inch undersize was available, a standard size babbitt bearing was installed. This bearing lasted about one week and was subsequently replaced several times in the course of two months. A standard size high lead copper-lead bearing became available and was assembled on this poor crankpin. To date, the copper-lead bearing has over 12,000 hours on it and appears to still be going strong.

Conformability—This property is enhanced by the application of lead-tin overplace 0.001/0.002-inch thick. It appears to be adequate to conform to the usual assembly irregularities and deflections of the slow speed engine.

Foreign particles in the lube oil have not been particularly troublesome in any of the engines of this type. This is no doubt due to the excellent filtration systems used in such applications. Imbedability is judged to be entirely adequate.

Corrosion Resistance — Copper-lead is subject to corrosion by certain acids formed in the lube oil. If the recommendations of a repu-

(*Please turn to Page* 114)

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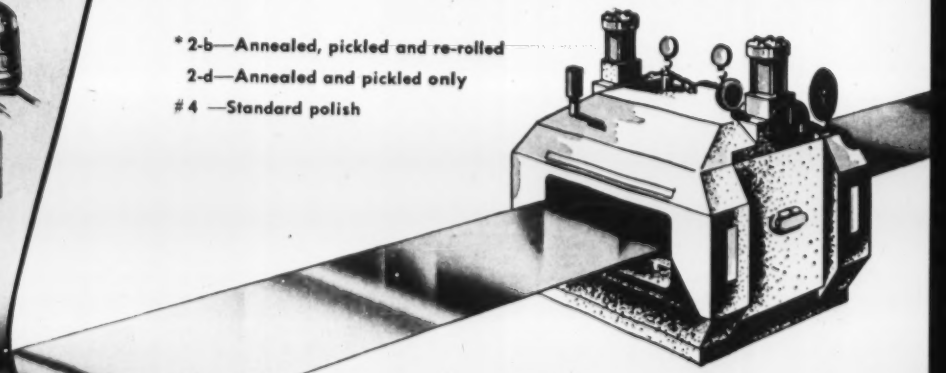

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Blast Furnace Practice...

IV—Influence of coke ash on thermal effects

Thermal economy in smelting operations depends upon efficient use of heat and not alone upon means of its generation. Important relationship exists between constituents of tapping slag and per cent of ash in coke

By CHARLES E. AGNEW
Consultant
Blast Furnace and Sintering Plant Operations
Cleveland

COKE ash constitutes about 25 per cent of the slag forming constituents in any blast furnace operation, even with ideal conditions for forming slag. Consequently its effect on thermal conditions within the furnace, particularly as slag forming conditions vary from the ideal, is of major importance to furnace operating economy.

Bureau of Mines research (technical paper No. 391) proved combustion of coke carbon occurs in a zone immediately adjacent to the tuyeres, Fig. 6. The same research proved the greater percentage (Southern furnace, 87.4 per cent) of silicon contained in iron cast from the furnace is reduced from the oxide and enters the iron as it passes through the bosh. Since coke ash chemical constituents are largely acid (silica and alumina) enough bases for fluxing ore gangue acids plus coke ash acids must descend through the furnace to be available for fluxing ash when it is released from coke with combustion of carbon at the tuyeres. Since coke ash acids constitute approximately 25 per cent of total slag constituents it is inevitable that slag will become progressively more basic as it descends through the bosh, from the initial zone of formation at the top of it, to the coke combustion zone at the bottom. With assimilation of coke ash acids, the slag is then neutralized to the acid/base composition which is flushed from the furnace.

Slag Data Changes—When describing thermal requirements of bosh and hearth operation Johnson[1] combined the two zones as unit and used the terms "critical hearth temperature" and "free running temperature" of slag to define the operating control factor, but in light of Bureau of Mines research and isolation of the two zones into their respective dimensions it is now known that slag temperature and chemical composition vary throughout the bosh and hearth. Johnson was first to conceive the two thermal equations of blast furnace operation but Bureau of Mines scientists were first to determine the zone of coke combustion and zones of reduction of elements alloyed with iron, thus determining the cause of differences in slag chemical composition and thermal requirements at different stages of its formation. Opinion is offered that in so doing the bureau established that Johnson's critical hearth temperature is in reality a critical lower bosh temperature.

This temperature is determined by the need for conservation and concentration of heat in slag of the lower bosh to the amount required to assimilate the ash released from coke with carbon combustion at the tuyeres, without disturbing the free running property of slag tapped from the furnace. At the same time thermal requirements for chemical reactions within the bosh, and drainage of heat from the upper bosh are satisfied by gas entering the shaft. Since each of these three demands for heat are subject to wide variation the elusive nature of the "critical"

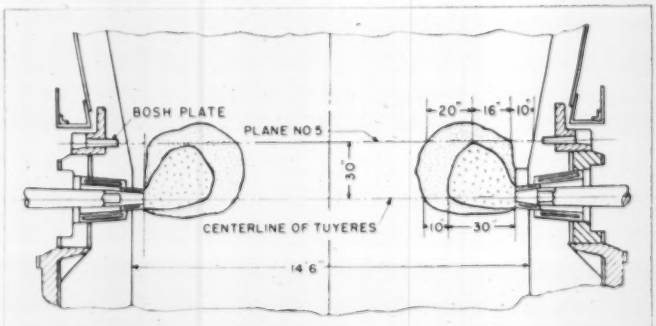

Fig. 6—Approximate size and shape of combustion zones

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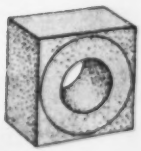

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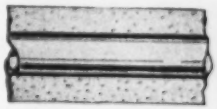

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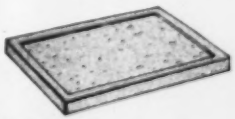

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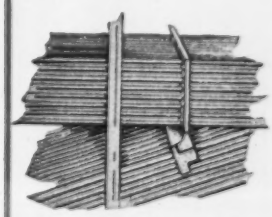

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bosh and hearth thermal requirements is self-evident.

How Conditions Are Indicated— Effect of coke ash on bosh thermal conditions may be indicated with a mathematical calculation of slag temperature at different stages of its formation using a constant ore mix but varying ash content of coke. Fig. 7 illustrates a comparison of temperatures for four slags calculated from an ore mix containing 8.00 per cent silica and 2.20 per cent alumina, with coke ash varying in multiples of 2.00 per cent from 8.50 to 14.50 per cent. In the four calculations ore weight was held constant with just enough bases added to hold tapping slag to a constant 1.06/1.00 acid/base ratio. Obviously weight of slag produced will increase progressively with addition of ash and bases to flux it.

Comparison of slags in Fig. 7 indicates that the effect of coke ash on operating practice and economy is dual in nature, (1) increase in ash content causes increase in weight of slag produced; (2) ratio of slag-forming constituents in the furnace bosh which are unfavorable to thermal distribution and economy. Maximum amount of heat, which can be produced from a pound of carbon burned at the tuyeres, is fixed by thermochemical laws; the amount of carbon which a pound of coke can contain is determined by the percentage of ash contained. Therefore, since weights of coke used in the respective calculations were equal, the amount of heat which could possibly be produced from each is progressively lessened from A to D in multiples of 2.00 per cent and D would produce only 6.00 per cent less heat than A. This does not appear to be a serious matter in itself, but the relatively small difference in heat production and the commonly known ill effects of high ash coke on furnace operating practice, indicate that thermal economy in blast furnace operation is determined by the degree of efficiency with which heat is used and not alone by the ability to generate it.

Components Are Related — Weight of slag produced increases progressively from A to D, consequently volume of heat consumed per pound of slag would increase in like progression, because tapping slag temperatures are the same for all four slags. Fig. 7, also indicates that the ill effect of increased ash content is not confined to the weight of slag alone because:

1. It increases greatly the thermal requirements for forming slag in the bosh due to the change in ratios of slag forming constituents there.

2. It increases the loss of heat from the bosh by increasing the temperature at the top of it.

3. It increases the drainage of heat from the bosh by reason of gas entering the shaft.

Items of major interest in Fig. 7 are (1) differences in thermal requirements and effects are greater in stages of slag formation preceding the tapping stage than they are in the tapping stage; (2) some condition of mineral composition occurs between 10.50 and 12.50 per cent ash which caused greater increase in initial formation temperature than occurs between 8.50 and 10.50 per cent ash.

To illustrate the effects of different percentages of coke ash, and to isolate any critical condition of slag mineral composition, a series of calculations was prepared using the ore mix of Fig. 7 for a base

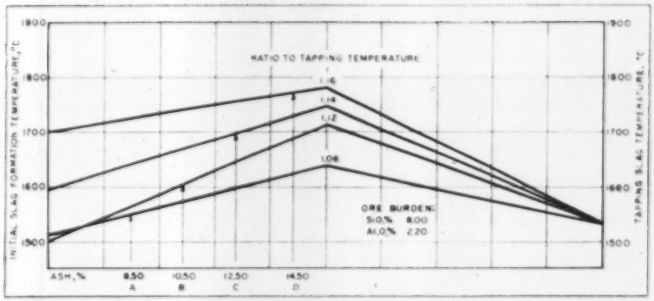


Fig. 7—Comparison of temperature for four slags

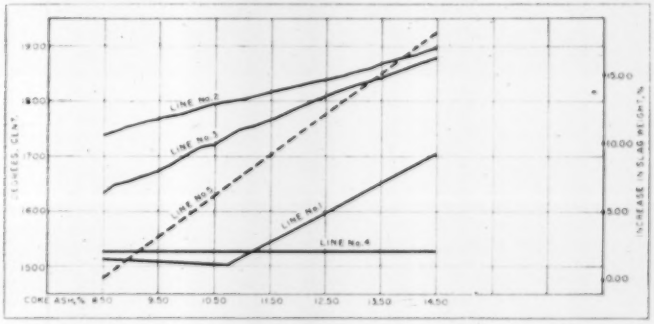
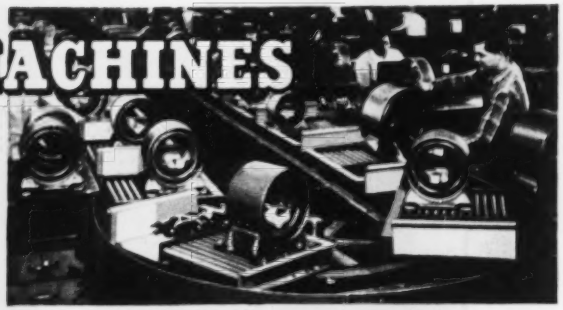
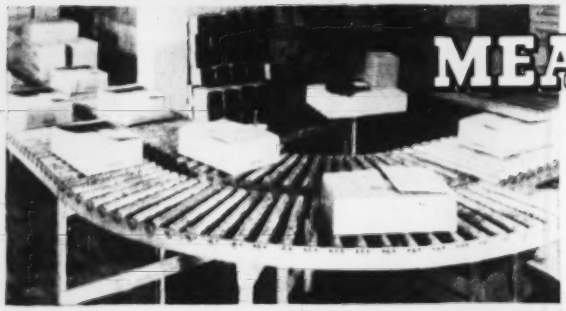


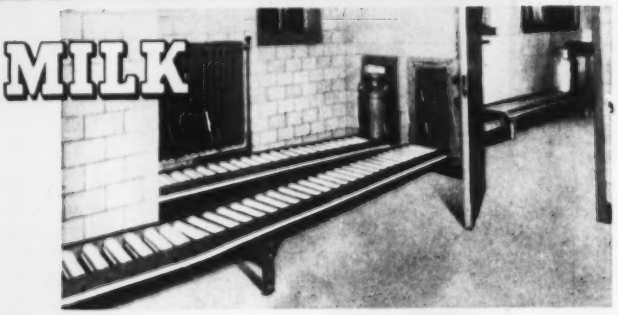
Fig. 8—Trend of changes in thermal requirements and effects

TABLE II—CRITICAL CHANGE IN MINERAL COMPOSITION

Ash content	10.75%				11.00%			
Line	1	2	3	4	1	2	3	4
Tetrahedron	6	7	7	6	8	7	7	6
Slag minerals	Per Cent							
Akermanite	34.69	12.69	33.08	35.16	34.51	10.84	30.88	35.23
Tricalcium disilicate	36.79	....	....	6.24	36.99	....	....	6.39
Monticellite	....	14.09	1.96	....	....	15.12	3.26	....
Calcium bisilicate	0.98	....	....	15.95	....	....	....	15.65
Gehlenite	27.51	29.45	33.06	42.63	27.44	29.34	33.00	42.74
Calcium orthosilicate	....	43.76	31.90	....	1.03	44.70	32.86	....
	99.97	100.00	100.00	99.98	99.97	100.00	100.00	99.98







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calculation, with increases in coke ash in multiples of 0.25 per cent, adding just enough bases to flux the additional ash and still maintain the 1.06/1.00 acid/base ratio in tapping slag. The ore mix of Fig. 7 is reasonably representative of an ideal mix.

Value Held Constant — As coke ash was increased in multiples of 0.25 per cent, the ratio of ash constituents to each other were held constant. In actual coke the respective constituents do not increase in direct ratio but for purpose of comparison they were held constant to minimize minor distractions.

Comparative data of this series of calculations are shown in Fig. 8. Trend of changes in thermal requirements and effects, and increase in slag weight, are indicated as percentage of coke ash increases. Since acid/base ratio in tapping slag (Line No. 4) and ratios of respective constituents to each other were held constant, calculated temperature of slags remain constant, but increase in slag weight (Line No. 5) is progressively increased, and, although the difference between 8.50 and 14.50 per cent ash is only 6.0 per cent the increase in slag weight is 19.43 per cent.

Thermal requirements due to weight would be increased in direct proportion to increase in weight. Initial stage of slag formation (Line No. 1) shows a slight downward trend in temperature between 8.50 and 10.50 per cent ash. This indicates that the 2.25 per cent increase in ash content would be adversely reflected only in thermal requirements due to the increased weight of slag produced. The slag weight with an ash of 10.75 per cent is 7.30 per cent greater than it is with an 8.50 per cent ash. A sharp increase in temperature between 10.75 and 11.00 per cent ash, however, indicates a critical change in mineral composition which would cause an increase in temperature, and a continued progressive increase as the ash content increases. Thermal requirements to meet temperature increments would increase in proportion to increases in temperature.

Table II is condensed data from calculations which isolated the cause of change in initial slag tem-

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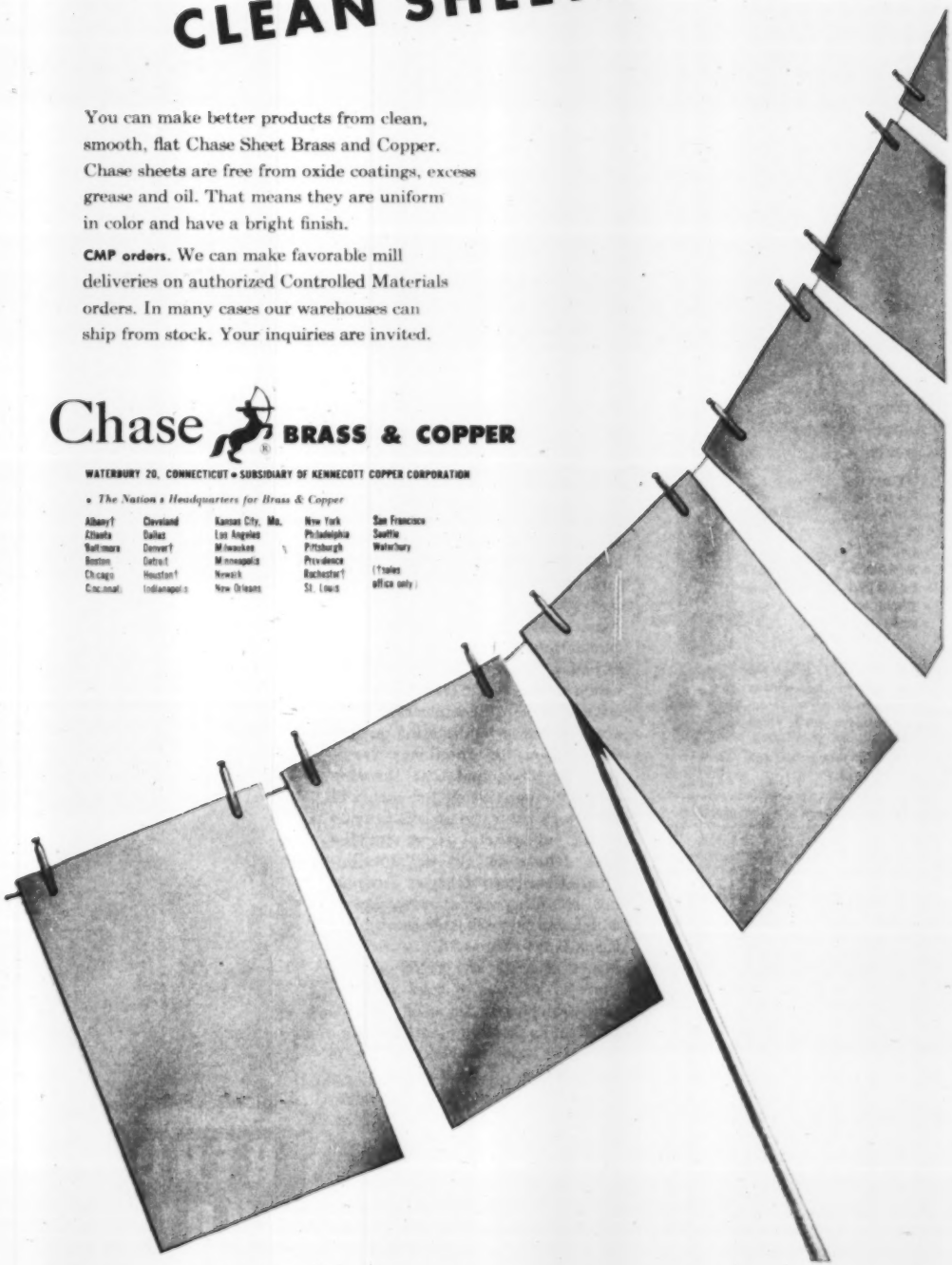

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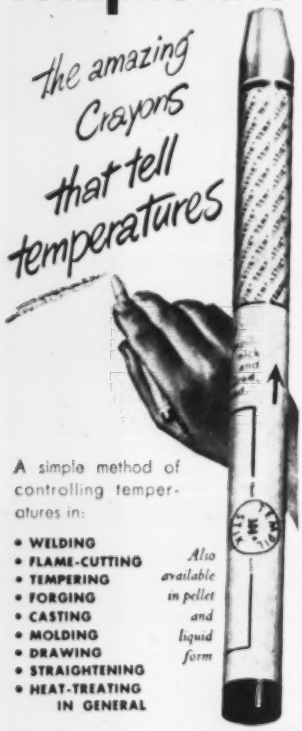

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150	300	550	1100	1650
163	313	600	1150	1700
175	325	650	1200	1750
188	338	700	1250	1800
200	350	750	1300	1850
213	363	800	1350	1900
225	375	850	1400	1950
238	388	900	1450	2000

FREE —Tempil® "Basic Guide to Ferrous Metallurgy" — 16¼" by 21" plastic-laminated wall chart in color. Send for sample pellets, stating temperature of interest to you.

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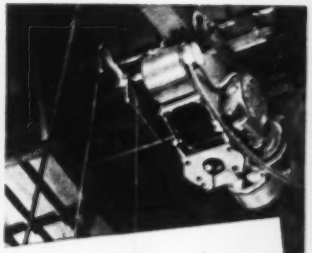
perature between 10.75 and 11.00 per cent ash. The mineral percentages shown in the table indicate the specific cause to be the formation of calcium orthosilicate (melting temperature 2130° C) in the initial stage of slag formation.

Includes Isolation Feature—Isolation of the cause of critical change in mineral composition and temperature in the initial stage of slag formation is the item of particular interest in Table II. But since percentage of coke ash was the only variable permitted in compiling the data the critical point indicated is not representative of the many variable influences which occur in actual operation. To determine other influences a series of calculations was prepared and the critical mineral composition in the initial stage of slag formation was isolated for different ratios of silica/alumina in the ore mix, different ratios of ore gangue to coke ash gangue, and different acid/base ratios in tapping slag.

Coke having low ash content always has the advantage with regard to weight of slag produced but the series of calculations indicated the advantage may be destroyed by adverse ratios of slag constituents to each other. The calculations indicated each per cent of coke ash, or fraction thereof, would have a different point of critical mineral composition with every ore mix of different gangue composition, or fractional variations of them, and that the safe range in composition for each will vary with the ratio of constituents which ultimately form tapping slag. These certain variables indicate the utter futility of attempting to set production standards which can be applicable to all blast furnace operations. Data also revealed that for any given ore mix there is a range of coke ash content which may be used without ill effect to furnace operation other than the unavoidable increase in slag weight.

However, the effect of slag weight on operating economy is not determined by pounds of slag formed per charge of ore and coke but by pounds tapped from the furnace per ton of iron produced. Furnace plants located in favorable scrap markets can enrich the ore mix in



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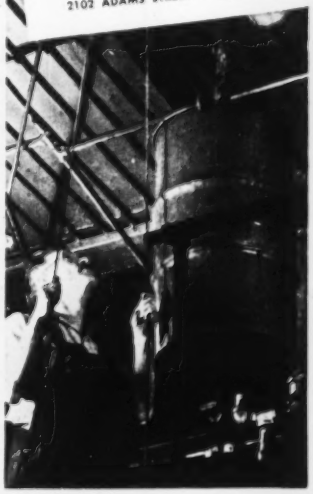

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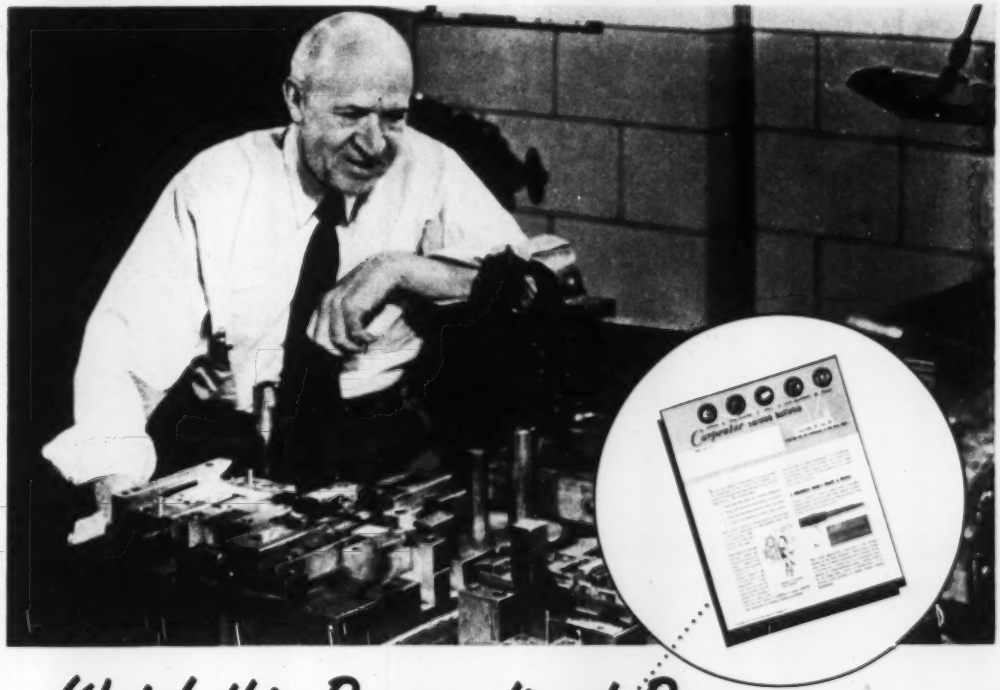

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iron content without increasing the weight of slag formed per charge, consistent with necessary desulphurizing action of slag. Introduction of this commercial factor into the subject again emphasizes the futility of attempting to set production standards applicable to all furnace operations because a commercial consideration which may be favorable in one locality may be unfavorable in another. But ideal conditions for forming slag in furnace operation are the same in all localities, and as indicated these conditions are determined by the ratio to each other of the slag forming constituents at the different stages of slag formation.

Operator Faces Difficulty—Even with the importance of slag mineral composition to thermal requirements and effects within the furnace fully recognized, it is difficult for the furnace operator to hold slag to the ideal composition at all times because of the many variable operating conditions and irregularities in raw materials. If available raw materials do not have the chemical composition, which permits the proper ratio to each other of slag forming constituents, it is impossible to achieve an ideal slag composition.

There is a reasonable range in raw material and slag chemical compositions within which normal adjustments in burden and flux may be made without disturbing the preferred thermal conditions in the furnace. Ill effects from unfavorable ratios in slag constituents is more pronounced in stages preceding the tapping stage than they are in the tapping stage, but, since the tapping stage offers the only practical means for observation, judgment of the furnace operator must be based upon conditions in that stage. Combining conditions of actual observation with correct theoretical reasoning enables the operator to visualize conditions within the furnace.

A broad viewpoint is necessary to visualize blast furnace operating principles. Compilation of practice data for long periods of time is necessary to illustrate and prove the principles in actual operation, and to minimize influence and distraction of fluctuations in operating conditions which occur daily.

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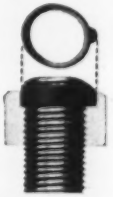
IF YOU are one of those people who believes a cotter pin is the only way to hold anything positively on a shaft you will be surprised at tests made on Security Locknuts. Authoritative tests have proved Security Locknuts practically vibration proof.

Security Locknuts stay "put" where you wrench them even in the face of vibration that destroys the bolt. They permit accurate adjustments with a torque wrench. They are complete as a unit. There is nothing to line up. Installation involves only one operation and there are no holes to weaken the bolt or stud.

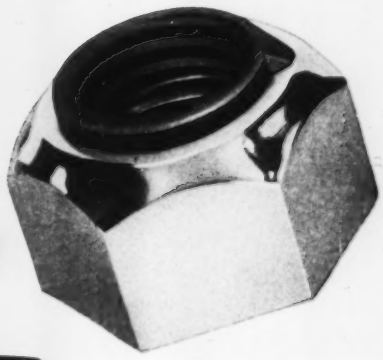
Security Nuts can be adjusted and re-adjusted any number of times but more important, they can be *removed and re-used over and over again without materially losing their locking power and without damage to the bolt.* We'd like to have you see the results of these tests. If you have a vibration or fastener problem, Security Locknuts are a dependable solution and may save you money over methods you are now using.

Security Locknuts are made in ⅜ in. to 2 in. bolt sizes. Ask to see the Security Locknut Tests.



This picture shows a cross-section of a Security Locknut. The insert, indicated removed, is of high quality heat treated, alloy spring steel and becomes a permanent part of the nut.

The insert is elliptical in shape and this design causes the retainer to grip the bolt with the terrific tension that only spring steel of great strength could exert and prevent the nut from turning. Simple—dependable—positive!



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SPECIAL OFFER! Here's an easy way to arrive at thread tolerance figures. Ask for a Security Thread Tolerance Chart. Just spin the dial and you have the figure you need. Send the coupon. It's yours for the asking.

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WESTINGHOUSE
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Multiply effective time of maintenance men with this matched pair

How much time do your maintenance men spend lubricating motors—or servicing starters? It is valuable time which could be applied to other equipment. Take the case of a southern mill for example:

THEY THREW GREASE GUNS AWAY—and freed men for other important maintenance. Here's how. In this mill, 75 motors drive knitting machines. Formerly, they were lubricated weekly. Four years ago, Life-Line motors were installed. ALL have been operating four years—continuously 16 hours a day, 6 days a week. Yet, they *never* have been lubricated. There have been no outages.

Maintenance men carry only an oilcan for oiling knitting machines. Lubrication time has been cut in half, releasing them for time on other equipment to keep it in top running shape.

BUT THAT'S ONLY HALF OF THE STORY. Life-Linestarters® cut maintenance two more ways. They reduce motor burnouts through the positive protection afforded by the bimetallic disc. They require minimum servicing. Exclusive "De-ion®" grid confines, divides, and extinguishes arc—increasing contact life.

Together Westinghouse Life-Line motors and Life-Linestarters are your best defense against outages . . . your best bet to free maintenance men for other duties. Why not get the advantages of this matched pair?

Call your nearby Westinghouse representative for data on the complete line of Life-Line motors and starters. Ask for copies of "Life-Line Motor Book", B-3842, and "Tomorrow's Starter Today", B-4677. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-21629

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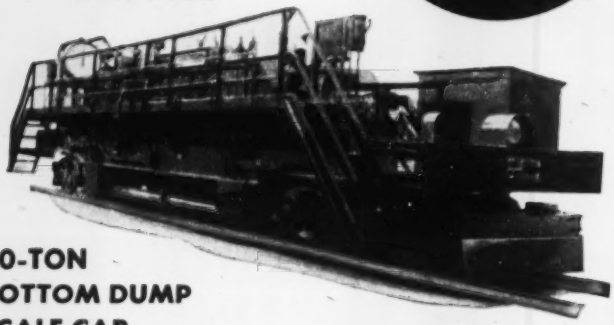
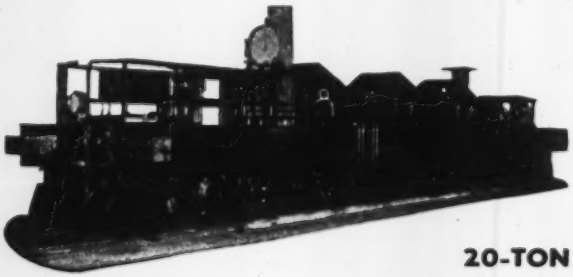


40-TON BOTTOM DUMP SCALE CAR

Car has anti-friction bearings throughout, including axle mountings. Foot-operated "Dead Man" control is interlocked with air brakes to apply brakes automatically. Provided with Atlas all-steel scales and 30" indicating dial. Type printing recorder attachment provides automatic weight registration at skip pit. All standard safety features, including red marker lights and lights for illuminating the front of the bin.



20-TON DOUBLE HOPPER BOTTOM DUMP SCALE CAR

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Consistency with which the operating theories presented in this analysis can be sustained will be illustrated with actual practice data from two furnace operations, each covering a period of four years of operation.

(To be continued)

1 "Principles, Products and Operation of the Blast Furnace" (1918) by J. E. Johnson Jr

Felt for Finishing

(Concluded from Page 89)

tions or with grains finer than No. 180. Cement, rather than glue, is recommended for coarse grains or wheels to be used at unusually high speeds. Felt wheels of six to 18 inches in diameter, set up with glue, can be used at speeds up to about 9000 surface feet per minute. If speeds in excess of 9000 surface feet per minute are contemplated, set up wheel with cement.

Small felt wheels, and particularly felt bobs, under 6 inches in diameter are generally used on flexible shafts at somewhat higher speeds. Flexible shafts have a tendency to vibrate or chatter felt wheels or bobs. Often they wear unevenly or the coating of grain is scuffed off. It is advisable to use grease when wheels or bobs are used on installations with flexible shafts.

Booklet Gives Primer Formulas

A 20-page booklet containing 27 lead base primer formulations is available from the Lead Industries Association. Entitled "Red Lead Technical Letter No. 6," publication contains formulas that give protection to ferrous surfaces under many types of service conditions.

Included are formulas for use under ordinary atmospheric conditions, severe atmospheric conditions, tidewater exposures and submerged exposures in both fresh and salt water.

Bulletin also contains a formula index and table of general properties to aid formulators and specifiers in selecting paints for their particular requirements. Suggested uses are listed for each formula. Copies of bulletin may be obtained from the association, 420 Lexington Ave., New York 17.

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and light
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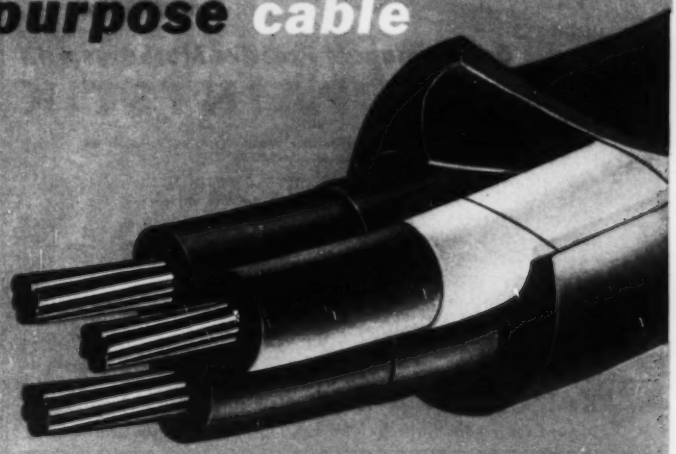

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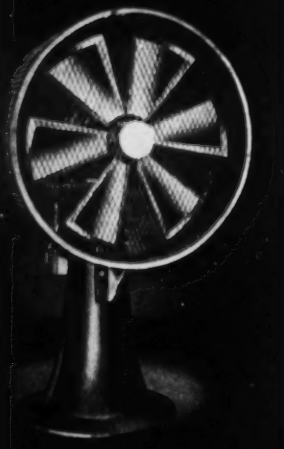

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Manufacturers of Industrial Machinery Since 1873

PERKINS MAN COOLERS

TRADE MARK REGISTERED UNITED STATES PATENT OFFICE

Planned to Produce

(*Concluded from Page* 93)

spotting of smaller parts, Lincoln designed its own movable bins. Welded construction, they can be stacked 14 feet high to conserve floor space. Overhead crane equipped with four-legged grab moves the bins.

To keep plant floor 100 per cent productive, all employee facilities are located in an underground center tunnel that runs the 1400-foot length of the plant. Convenient stairways place even the farthest ends of bays only 200 feet from lockers.

Location of the office is a prime convenience for both office and factory employees—the exact center of the plant. Office serves as a divider between space for welder manufacturing and electrode manufacturing. Office space is split accordingly with employees positioned near section of plant most convenient for their work.

Plant is located on a 65-acre site, has 850,000 sq ft of floor space. Austin Co., engineers and builders, designed special ventilating system for the windowless building that circulates conditioned air at the work level, substantially reducing air conditioning costs.

Walls of the building are 25 feet high. First 9 feet are brick, balance is an aluminum-steel curtain wall easily moved if plant expands. Clearance under roof trusses is 23 feet to give operating space for cranes and permit stock storage up to 17 feet.

Receiving dock runs 1400 feet along north end of the plant. South end provides equally long shipping facilities. Both docks can be served by freight cars or trucks that move right into the plant.

Reagent Catalog Published

Catalog of laboratory reagents and fine chemicals is offered by Baker & Adamson Products, General Chemical Division, Allied Chemical & Dye Corp., New York. The 264-page book covers more than 1000 high purity chemicals, including such facts as grades, strengths, maximum limits of impurities, etc., on all reagents. Copies are available to qualified users and buyers from the company, 40 Rector St., New York 6.

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Tough operating conditions mean nothing to this rugged, service-proven mobile crane. Operates with top speed, ease, and economy in any season or weather. It's designed to handle all types of jobs . . . dismantling, moving or erecting machinery . . . loading and unloading structural iron, pipe, bars, lumber and equipment of all types. Takes high cost and hard work out of material handling jobs for trouble-free, reliable operation. Reduces operator fatigue and increases production.

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A 6021-2/3-C

Copper-Lead Bearings

(*Concluded from Page* 96)

table oil manufacturer are followed regarding type of oil and change period, corrosion presents no problem. One case of copper-lead corrosion was reported to have occurred in a gas engine equipped with top cylinder lubricators. These lubricators had been charged with an additive concentrate, acidic in nature, and, through faulty operation, permitted a large quantity to contaminate the lube oil. Severe lead loss resulted in 400 hours.

Shaft wear with the overplated bearing has been no greater than obtained with the babbitt type. Of the seven engines covered here, one was equipped with a cast alloy iron shaft and the others with forged steel shafts. The steel shafts averaged about SAE 1045, heat treated to obtain a tensile strength of 80,000 psi, a yield of 50,000 psi, elongation 25 per cent and Brinell hardness of 190.

Nonseizure characteristic of this copper-lead has been adequately demonstrated in laboratory and engine tests by running such bearings without the overplating. The natural bearing qualities are sufficiently good to give acceptable performance should the overplating be worn off in time. The over plating materially assists in conditioning a freshly ground or turned and polished shaft and in equalizing concentrated loadings caused by slight assembly irregularities.

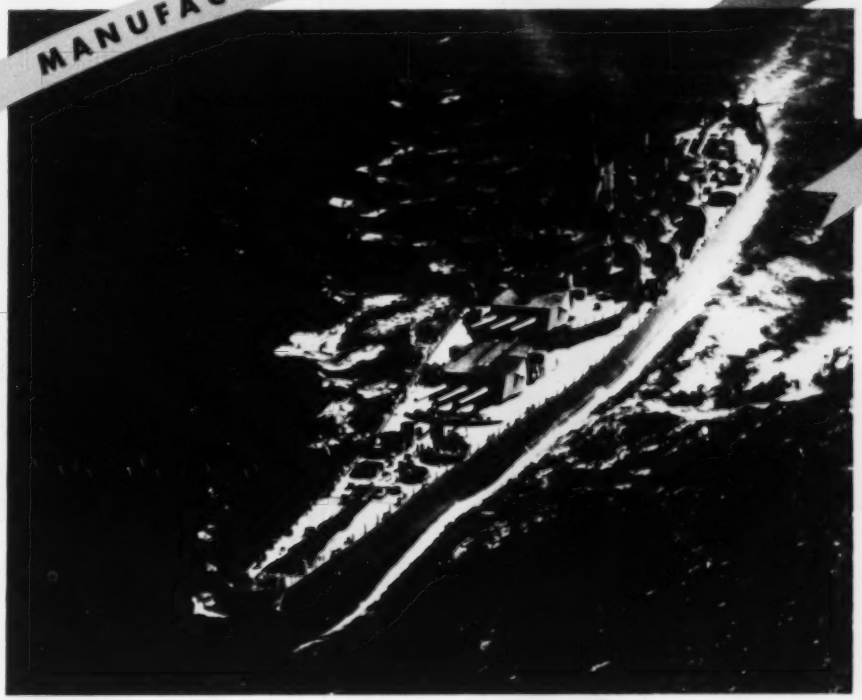
Manufacturing costs at the present time run several times that of a babbitt bearing of the same design. As the demand increases for such bearings, better and cheaper methods will be devised to produce them. Even at their present cost performance obtained from them warrants the increased cost.

Fabricator Facilities Described

Facilities in the multiproduct operation conducted by International Steel Co., Evansville, Ind., are described in a 44-page booklet, released to acquaint buyers with its varied product line. The company specializes in difficult steel fabrication. It manufactures standard steel industrial buildings, revolving and industrial doors.

BULLARD

MANUFACTURERS OF MACHINE TOOLS



U.S.S. *Missouri* — Official Photo—U. S. Navy

The Invisible Background of Industrial Progress

U.S.S. *Missouri* known as "THE MIGHTY MO" manned by free men typifies the caliber of the armed strength of the United States. In our world of today, with distances in terms of time, shorter than ever before, our Navy is a large and important unit of the Armed Services. . . Modern design of naval and commercial transport vessels includes many complex and intricate mechanisms. These designs are carried through fabrication and assembly to the final stages of shipbuilding only through the use of ★ *Modern Machine Tools*. . . Further maintenance and repair of the naval and commercial fleets depend upon machine tool equipment aboard ship as well as in naval bases and ship repair yards on our coast lines and in foreign waters. Machine tools used for these purposes insure the continued operation of naval and maritime activities thus, in turn, insuring adequate marine defense and international trade. . . Design of Bullard equipment, advances parallel to modern shipbuilding design and practice.

★ *For greater manufacturing economy*
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THE
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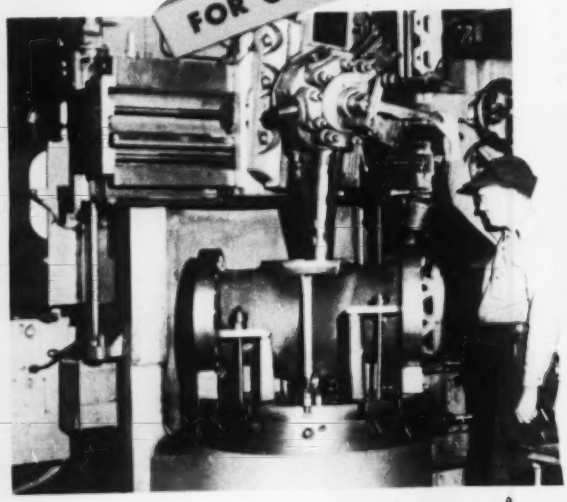
BULLARD MACHINE TOOLS

FOR GREATER MANUFACTURING ECONOMY

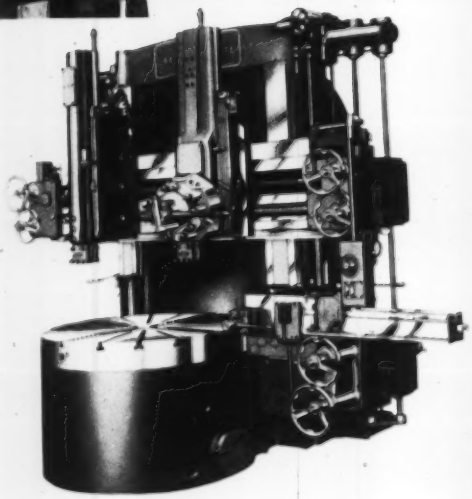


The name Cut Master Vertical Turret Lathe implies its Versatility, Accuracy and Dependability in repetitive manufacturing of wide varieties and classes of work. Rugged construction suitable for cutting with heavy feeds and high speeds is conducive to greater manufacturing economy.

Versatility of a machine tool is not confined alone to its operating features but extends to quick change-over for single piece or short run jobs found in many plants, especially the maintenance shops.

Shipyards and repair bases are typical of this class of work in the manufacture and maintenance of such component units as propulsion and steering mechanisms, winches, valves, pumps and fittings.

Bullard is proud that Cut Master Vertical Turret Lathes play an important part in the building and maintenance of naval and commercial fleets.



For manufacturing economy use Cut Master Vertical Turret Lathes built in 30-, 36-, 42-, 54-, 64-, and 74-inch sizes.

BULLARD

THE BULLARD COMPANY

BRIDGEPORT 2, CONNECTICUT

Titanium Production Up

Not only is metal output soaring but processing improvements are numerous

PRODUCTION of titanium metal is getting into the long-pants stage. To meet vital military requirements, it is being developed at a much faster rate than usual for a newly produced metal.

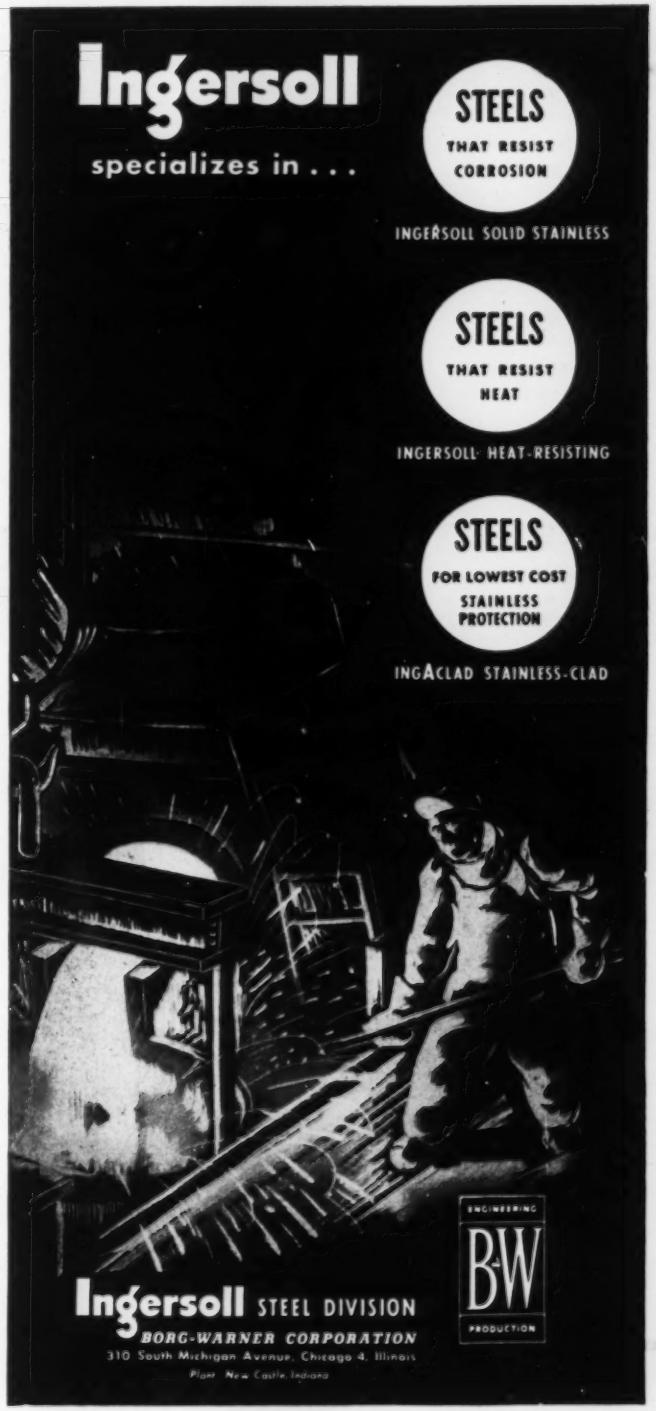
First small-scale commercial production of ductile titanium metal was started by Du Pont in 1948. This was in a small unit at the Newport, Del., plant of the pigments department. Rated capacity was 100 pounds a day, but its production did well to run half that much. Now a new plant has been built at the same location which turns out regularly greater-than-ton lots of the metal. Production now is at the rate of 1½ tons per day and is expected to get up to 2½ tons per day in 1952.

Process Better—Broad improvements have been made in the manufacturing process itself. The technique involves a reaction of titanium tetrachloride with magnesium, but differs from that originally used when production was first started.

Metal as produced by Du Pont is in the form of sponge. It looks like silvery gray coke. Before it can be fabricated, it must be consolidated. But titanium is such a "getter"—it quickly combines with gases in the air at high temperatures—that casting it into solid metal ingots presents one of those "impossible" problems. Once in ingot form, it can be handled readily.

Research teams overcame the difficulties by designing and building two special furnaces for induction and for arc melting of the metal by surrounding it with inert gases. The designs have been offered to titanium customers and at least six of them have been put in operation or are being installed by other companies.

Both furnaces at Newport are large enough to approach commercial proportions. In one of them, more than 15 tons of metal have been melted and ingots up to 650 pounds are now being cast. The other furnace, based on arc heating, may hold the key to the continuous melting and casting of



When you consider furnaces, think

Battery of F.E.I. Annealing Furnaces in a large eastern steel mill. F.E.I. furnaces are completely automatic . . . easy to operate . . . maintenance practically nil . . . minimum critical materials required.

These furnaces are controlled automatically from a single Remote Control Room, as pictured below.

F.E.I. Builds

Open Hearth Furnaces,
Soaking Pits,
Continuous Reheating Furnaces,
Forging Furnaces,
Annealing and Normalizing Furnaces,
Galvanizing Furnaces,
Complete Heating Lines for all kinds of armament—guns, armor plate, shells, etc.

# of F·E·I first

View of Blower that activates F.E.I.'s famous Eductor System

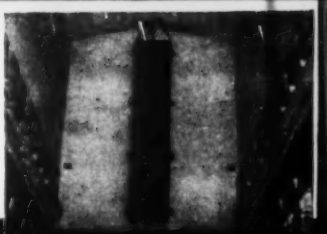
first THINK OF F.E.I.'s PERFORMANCE RECORD

Actual case histories (like examples cited at bottom of page) prove that all types of F.E.I. furnaces are doing an outstanding job. Leaders of industry, in America and abroad, recognize Furnace Engineers' ability to meet today's urgent requirements for output, while maintaining rigid metallurgical standards for quality.

Typical F.E.I. Burner Assembly — the 'heart' of the furnace

first THINK OF F.E.I.'s ADVANCED HEATING METHODS

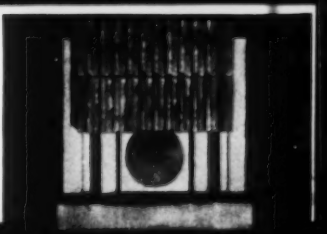
Furnace Engineers' patented, automatically controlled combustion system is the talk of the industry. There's a type of burner for every specific need—for every type of fuel. Each offers extreme flexibility, uniform top and bottom temperature, maximum fuel burning capacity for high production and ample turn-down ratios for extended soaking periods. F.E.I. furnaces utilize eductors, controlled atmosphere and other features to increase production economically.



Flue and Burner arrangement of cold strip sheet annealing furnace

first THINK OF F.E.I.'s "ALL-IN-ONE" SERVICE

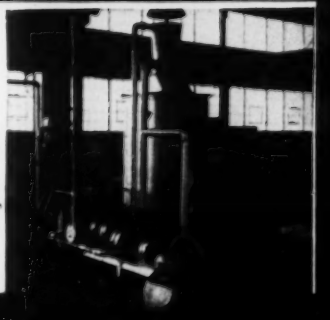
Yes, Furnace Engineers' service covers everything—from the preliminary analysis of your specific needs to final operational check-ups. Our staff includes top-flight engineers with up to thirty-five years of experience . . . specialists in the design, construction, installation and operation of all types of industrial furnaces.



Multi-jet Burner and Corrugated Baffle Tile (1 tile removed to show burner)

CASE HISTORIES reveal F.E.I. performance far beyond normal expectations.

A Slab Heating Furnace built for 50 TONS/HOUR actually produced 67 TONS/HOUR; a Hot Dip Galvanizing Line, from which 72 UNITS/HOUR were anticipated, actually turned out 100 UNITS/HOUR; a Pipe Galvanizing Furnace produced 82,060 TONS before replacement of kettle; a Tool Steel Annealing Furnace exceeded specifications of not over 5° F. temperature differential between ends of a 15 ft. bar, with an actual performance of PLUS or MINUS 2° F. These and many other cases merit consideration whether your need is for a new installation or the modernization of existing furnaces.



Venturi & Transition for galvanizing furnace (Blower, Valves, Controls, etc.)

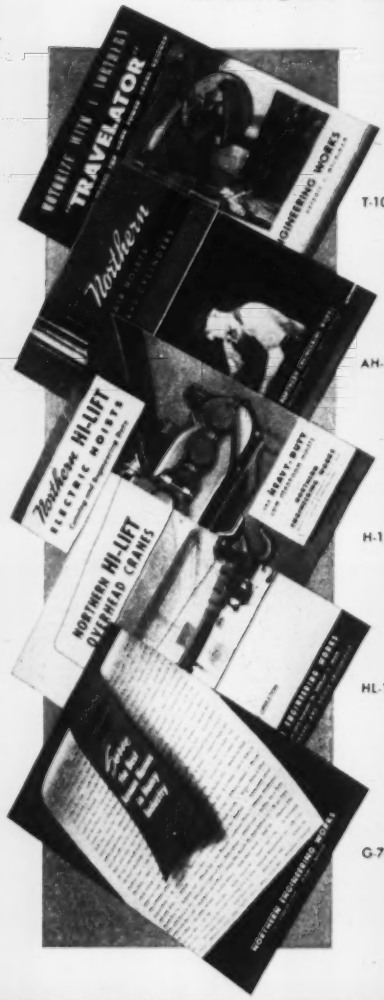
Furnace Engineers, Inc.

F.E.I. BUILDING, 1551 W. LIBERTY AVE. PITTSBURGH 16, PA.

for your file....

NORTHERN'S

Latest Bulletins



NORTHERN ENGINEERING WORKS

2615 ATWATER ST. DETROIT 7, MICHIGAN

titanium—one of the factors necessary to mass production of the metal. In it, ingots can be formed continuously from molten metal, then cut to suitable lengths. Furnaces of this type are now producing ingots as large as 1200 pounds.

Varied Uses — Titanium metal will find use in the following fields:

1. Aircraft power plants: Its light weight and strength are needed here and temperatures of operation are reaching higher than aluminum alloys can withstand.

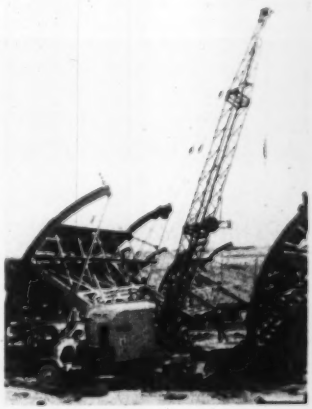
2. Air frames: As speeds increase, air frames must be stronger and operate at higher temperatures. Titanium fits these requirements.

3. Pyrotechnics: Titanium powder burns in air with intense heat. This will probably be a small market.

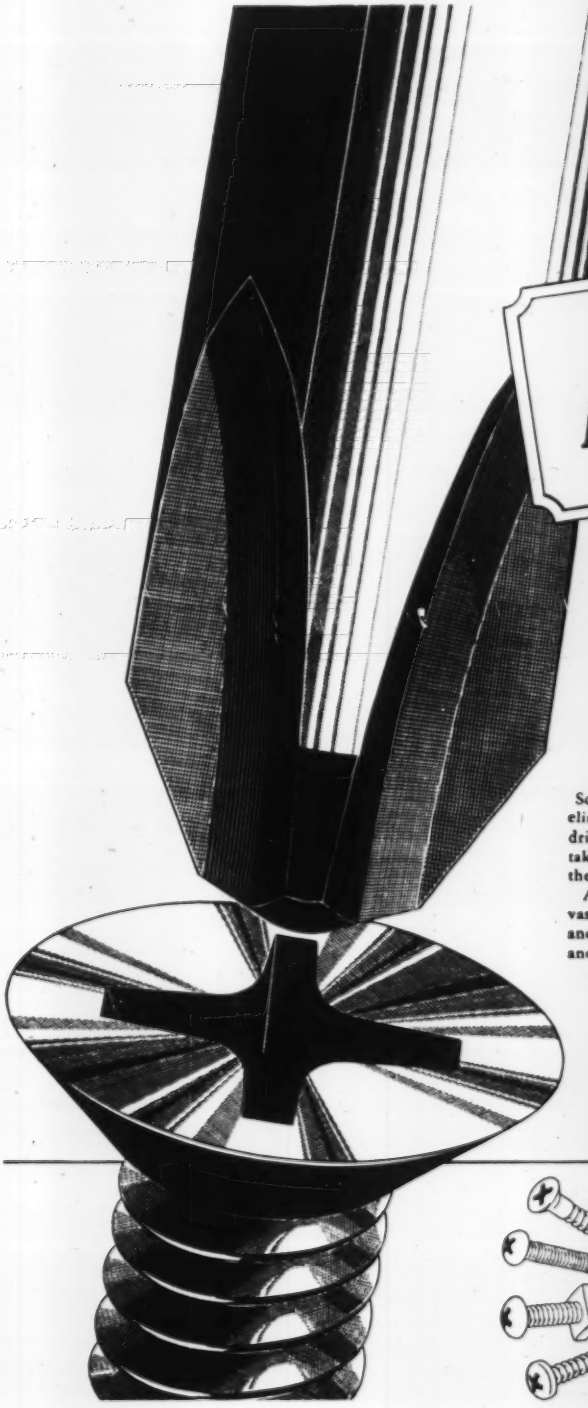
4. Low titanium alloys: A number of iron and nonferrous alloys use titanium in percentages from 0.1 to 3.5 per cent. Use of high purity metal in these alloys enables producers to get cleaner and stronger alloys with greater regularity.

5. Marine: The unusually fine

Crane Speeds Gate Assembly



BIG JOB accomplished by this 20-ton Lorain Moto-Crane for Morrison-Knudsen Co. Inc., Boise, Idaho, is the assembly of control gates for the spillway of C. J. Strike power dam at Grandview, Idaho. Crane is equipped with a 50-foot boom. This $18.5 million dam on the Snake river is one of five being built for Idaho Power Co. as part of an inter-communicating electrical system serving southern Idaho and eastern Oregon



THESE ARE AMERICAN

. . . American Phillips MACHINE SCREWS for fastest driving in Drilled and Tapped Holes (or with nuts)

When used in assembling metal parts, the 4-winged Phillips Driver and American Phillips Screws afford superior holding power, elimination of work-spoilage, and faster driving. Production "takes wings" . . . and the product takes on an up-to-date, quality appearance that catches the customer's eye.

American, as Phillips Headquarters, offers industry its vast stock of standard Phillips Machine Screws of steel and brass, in a variety of head styles, diameters, threads and lengths. Then, too, there is the large capacity of high-speed equipment for manufacturing special fasteners with machine-screw threads. And all these advantages add up to one practical fact: *It always pays to "ask American first."*

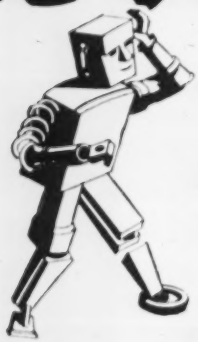
AMERICAN SCREW COMPANY

PHILLIPS HEADquarters

WILLIMANTIC, CONNECTICUT

Main Office & Plant
Willimantic, Conn.
Office & Plant, Norristown, Pa.
Office & Warehouse, Chicago, Ill.

STEEL SCRAP is VERY SCARCE



America's steel industry is essential to the nation's defense.

Large quantities of scrap are used by the steel industry.

YOU—in your plant or on your property have scrap that's urgently needed.

Unless you turn your scrap over to your scrap dealer, the steel so vital to American industry cannot be made.

GET YOUR SCRAP MOVING...TODAY

LOOK FOR THE YELLOW TRIANGLE ON THE REEL

Wire Rope—sinewy muscle of industry—is one more of the many products of steel upon which America depends for the increased production necessary to meet both civilian and defense demands.

Here, too, your scrap contribution is of vital importance... enabling us to serve you better... helping to provide you with continued, uninterrupted supply.

THE CALIFORNIA WIRE CLOTH CORP.— Los Angeles • Oakland • Portland • San Francisco • Seattle • Spokane
THE COLORADO FUEL & IRON CORP.— Abilene (Tex.) • Denver • Houston • Odessa (Tex.) • Phoenix • Salt Lake City • Tulsa
WICKWIRE SPENCER STEEL DIV.— Boston • Buffalo • Chattanooga • Chicago • Detroit • Emlenton (Pa.) Philadelphia • New York

WICKWIRE ROPE

CF&I PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL & IRON CORPORATION

corrosion resistance of titanium to sea water suggests its use in marine equipment.

6. Chemical equipment: Here again, its corrosion resistance—particularly to oxidizing, chlorine, and chloride reagents—brings it into consideration for chemical equipment.

7. Ordnance: Reports have been published that unalloyed titanium is more resistant to projectiles than any armor plate now in existence. If this is substantiated, the metal will be important in this field.

Stainless Speeds Rubber Flow

Corrosion-resistant stainless steel conveyor belts helped raise annual synthetic rubber production more than 12,000 tons at the government-owned plant in Port Neches, Tex. The plant, operated for the Office of Rubber Reserve by U. S. Rubber Co., was the first to resume production after reactivation of all stand-by plants in 1950. Designed to produce 60,000 long tons of GR-S rubber per year, it turns out more than 72,000 tons after an extensive modernization program.

CORROSION PROBLEM LICKED
. . . synthetic rubber output raised

One big improvement was installation of the eight stainless drier flights for conveying wet crude rubber through drying ovens. Conditions under which these conveyors operate—high humidity, plus presence of acid and salt—indicate high corrosion damage if the choice of material is unsatisfactory. Belts of black iron were used when the Port Neches plant was operated previously, costing heavily through difficulties from rust and product contamination.

Upon modernization, the corrosion-resistant material replaced black iron. Each conveyor has 173 hinged flights of perforated 16-gage, type 316 stainless. Flights are about 12 inches long and 115 inches wide. Engineers report that in addition to cutting out the rust-contaminated product, stainless does not cause crude rubber particles to adhere, as they did to black iron. This makes the dried product easier to remove from the conveyor and keeps perforations in plates from becoming plugged.

Book Helps Production Control

Management controls divisions, Remington Rand Inc., offers a 56 page book entiles, "Production Control Systems and Procedures." Book details a method of materials control said to result in a shorter production planning cycle by eliminat-

PERFORMANCE
"first" and "foremost"

Euclid Cranes and Hoists have always been built "up to a standard"—never "down to a price."

They appeal to the seeker for quality and he is never disappointed.

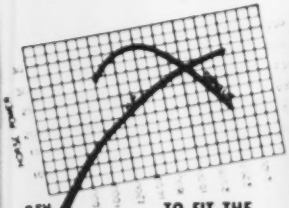
A list of purchasers reads like a "whose who" of industry. The record of repeat orders is significant and impressive.

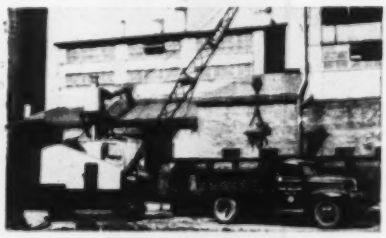
We'll be glad to discuss your problems in the light of our long experience and can doubtless offer some constructive suggestions as to methods and equipment.

Write for Catalogs.

THE EUCLID CRANE & HOIST COMPANY
1364 CHARDON ROAD, EUCLID, OHIO

EUCLID CRANES and HOISTS
Raise Profits





Power TO FIT THE MACHINE AND THE JOB — WISCONSIN-POWERED
Power Plants, Inc. Generator

Three carloads of scrap travel fast from freight cars to trucks every day with this crane on the job. It's equipped with a 36" ECM magnet, and the generator, built by Power Plants, Inc., Cleveland, Ohio, is powered by a Wisconsin Air-Cooled Engine.

Over and above time and labor saved through Wisconsin Engine dependability, servicing and maintenance are reduced to a minimum. For example, bearing failure is unheard of due to tapered roller bearings at both ends of crankshaft. Fool-proof air-cooling means no winter freeze-ups or summer overheating. And an easily-serviced OUTSIDE magneto with impulse coupling delivers all-weather quick starts. These features, combined with rugged construction, are the basis for the most dependable, most versatile power in the 3 to 30 hp. range . . . WISCONSIN POWER.

Write for details covering 4-cycle single-cylinder, 2-cylinder and V-type 4-cylinder models.

WISCONSIN MOTOR CORPORATION
World's Largest Builders of Heavy-Duty Air-Cooled Engines
MILWAUKEE 46 WISCONSIN

ing many causes of delays on the production line.

Illustrated with typical forms and procedure charts, it outlines procedures for engineering, production planning and progress, machine load, material and tool procurement and control. Included is a typical case history which reviews an installation that has been in operation for several years. Copies are available by writing the company at 315 Fourth Ave., New York 10, requesting publication X 1268.

Jet Alloys Are Tough on Tools

Cutting tools are not standing up under loads imposed by machining jet engine alloys and other tough materials used to make military equipment. Basis for this conclusion is a nation-wide survey, completed by the ASTE among production executives and engineers in companies of all sizes.

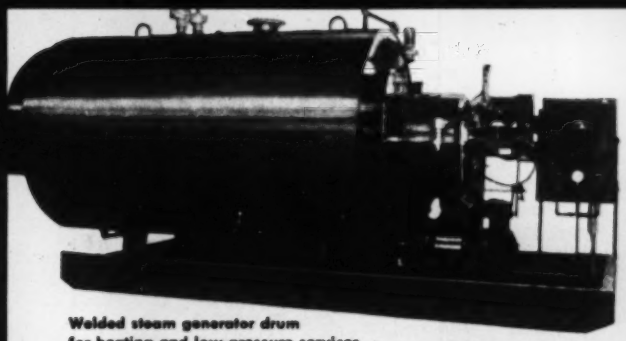
Among plants polled, 27 per cent indicated present cutting tool materials are wearing out too fast. Nineteen per cent requested specifically tougher, harder materials that will cut modern metals more efficiently, reports Harry E. Conrad, ASTE executive secretary.

In answer to other questions in the society's questionnaire, 10 per cent favored more tool standardization. Another 10 per cent felt they would be better able to maintain and apply their cutting tools by instituting tool control programs. Apparently industry's goal for higher cutting speeds and lower tool costs has been neared, because only 4½ per cent thought higher cutting speeds are necessary and 6 per cent want lower tool costs.

A more thorough amplification of the problems besetting cutting toolmakers and users is scheduled for March 18, the second day of the society's industrial exposition. A complete technical program and panel discussion will be devoted to the subject that day.

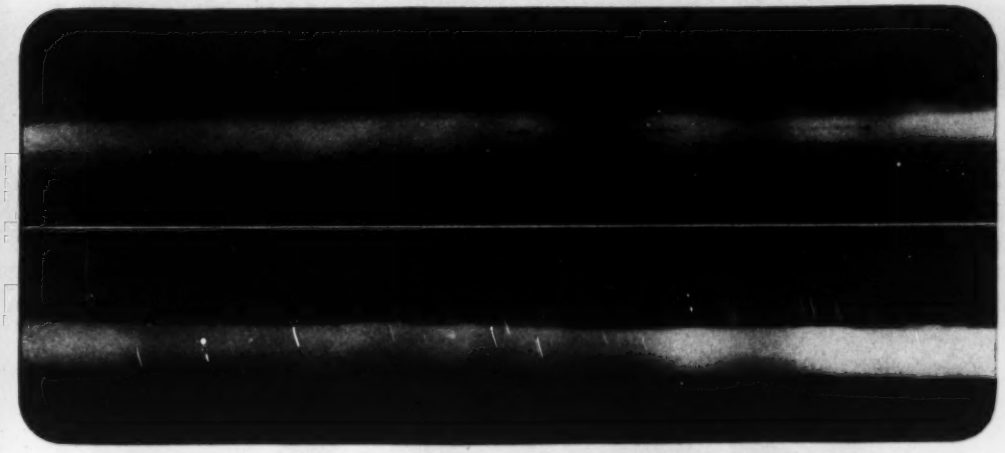
Unusual Industrial Booklet

Departing from the usual industrial booklet, Cooper Alloy Foundry Co., has published "Alloys in Cooperland." Book describes a trip through the magic city of stainless



Welded steam generator drum
for heating and low-pressure services.

Dependability up—cost and weight down—



thanks to RADIOGRAPHY

BECAUSE radiography proves it sound, welding can be used for making better pressure vessels. And with results such as these: In these steam boilers approximately 15% in weight was saved—costs dropped 10% to 20% dependent on design pressure.

Easy to see, isn't it, how radiography opens new fields for welding—why it increases business.

Radiography is quick to detect any serious lack of fusion or gas porosities in a weld. It can help you make sure only top-quality work leaves your shop.

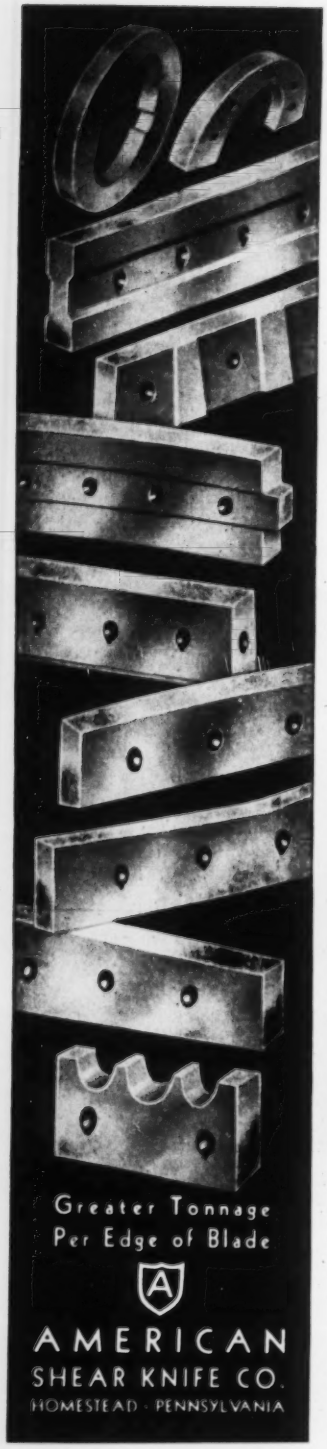
If you would like to know more about how it can help you, get in touch with your x-ray dealer and talk it over.

EASTMAN KODAK COMPANY
X-ray Division • Rochester 4, N. Y.

Radiography . . .

another important function of photography

Kodak
TRADE-MARK



alloys as taken by Alice in Wonderland's storybook associate, the Walrus.

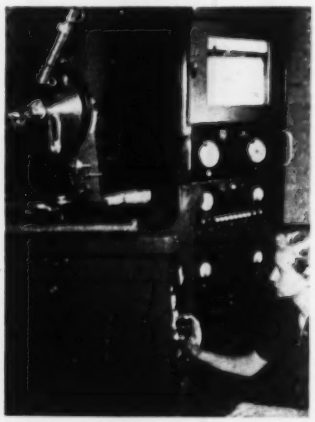
Illustrated in color, it is available to the general public at $1.00 per copy. Complimentary copies are offered to all connected with chemical or allied industries, or stainless alloys. For a copy, write to the public relations division of the company, Hillside, N. J.

Welder Runs on 100-Foot Track

Continuous welds 100 feet long can be made automatically with a welding gantry built by Manitowoc Shipbuilding Co., Manitowoc, Wis. Designed primarily for work on ship sections and crane booms, it travels along 100 feet of track and has a 28-foot traverse.

Flexible control of welding head has solved problems that result from shape and size of parts to be welded. Vertical head adjustment permits welding at any level to 6 feet above the work table. Bridge and carriage have separate drive mechanisms for welding up and

Improved X-Ray Spectrometer



CHECKING x-ray fluorescence equipment on improved Norelco Geiger counter recording x-ray spectrometer announced by Research & Control Instruments Division, North American Phillips Co., Mount Vernon, N.Y. Sample to be analyzed is held in wide-range goniometer (upper left). Results are recorded on chart at top of electronic circuit panel (right). Complete unit includes x-ray diffraction unit, wide range goniometer, electronic circuit panel with strip chart recorder

WYCKOFF

an established name in

COLD FINISHED
Controlled
BAR STOCK
Carbon and Alloy

*4 Strategic Locations**

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FIRST NATIONAL BANK BUILDING
PITTSBURGH 30, PA.

3200 S. KEDZIE AVENUE
CHICAGO 23, ILLINOIS

*Works: Ambridge, Pa. • Chicago, Ill.
Newark, N. J. • Putnam, Conn.

WHAT YARDSTICK DO YOU USE IN SELECTING GEARS?

On any basis of selection, Farrel-Sykes herringbone gears offer a number of advantages to designers and engineers responsible for the correct application and successful operation of gears. The quiet, vibration-free performance and long life you can expect from these gears result from extreme accuracy of tooth spacing, contour and helix angle...qualities inherent in the Farrel-Sykes method of gear generation.

The herringbone design provides a maximum number of gear teeth always in mesh. Overlap or interlacing of the teeth, together with gradual engagement, contribute to smooth operation. Opposed helices balance and absorb axial thrust within the gear member, eliminating harmful thrust loads and resultant stresses on other parts of the machine.

Farrel-Sykes herringbone gears are made of the finest grade materials, in a complete range of sizes for any power capacity and any application.

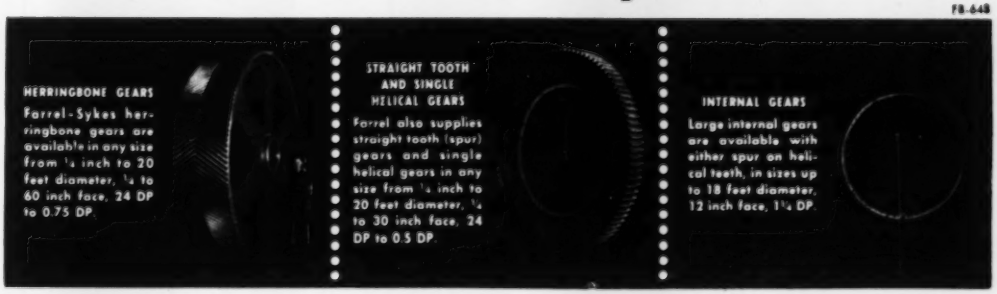
Farrel engineers are available to assist in working out unusual gear problems. Information about herringbone gears, or any of the other types mentioned on this page, will be sent on request.

FARREL-BIRMINGHAM COMPANY, INC., ANSONIA, CONN.

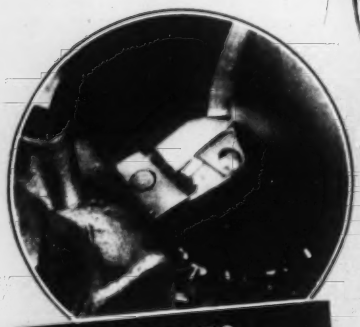
Plants: Ansonia and Derby, Conn., Buffalo, N. Y. • *Sales Offices:* Ansonia, Buffalo, New York, Boston, Pittsburgh, Akron, Detroit, Chicago, Minneapolis, Portland (Oregon), Los Angeles, Salt Lake City, Tulsa, Houston, New Orleans

Farrel-Birmingham®

FB-648


HERRINGBONE GEARS
Farrel-Sykes herringbone gears are available in any size from ¼ inch to 20 feet diameter, ¼ to 60 inch face, 24 DP to 0.75 DP.
STRAIGHT TOOTH AND SINGLE HELICAL GEARS
Farrel also supplies straight tooth (spur) gears and single helical gears in any size from ¼ inch to 20 feet diameter, ¼ to 30 inch face, 24 DP to 0.5 DP.
INTERNAL GEARS
Large internal gears are available with either spur or helical teeth, in sizes up to 18 feet diameter, 12 inch face, 1¼ DP.

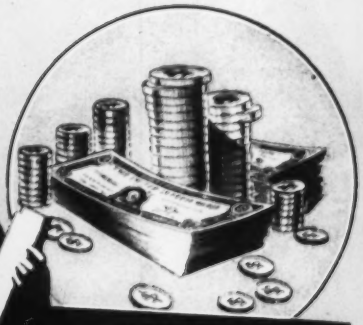
HOW TO ACHIEVE *Economic* FREEDOM



TURN TO KENNAMETAL

Kennametal Tools afford freedom from the economic worry of uncertain production costs, and help you get orders out on time. They save downtime . . . idle time for machines and men . . . because they take hard punishment without failure, because they machine more pieces between grinds, because with Kennametal clamped-in and indexable inserts a new cutting edge is ready without removing the tool from the machine.

Kennametal means faster machining of sandy castings, hard steel, on interrupted cuts . . . on non-ferrous metals and non-metallic materials. Kennametal is uniform in texture, always true to grade, as consistently dependable as gold itself.



RETURN TO GOLD COIN STANDARD

A Gold Coin Standard is to our national economy what Kennametal is to the metal working industries. Its quality is uniform and fixed, its value dependable.

Unredeemable money is never constant in value, its quality is unknown and shifting from day to day.

When you borrow gold and repay gold, nobody is cheated. When you borrow paper and repay in paper somebody is always cheated.

Without a gold standard the future is always fogged with uncertainty. A managed currency is the chief instrument of governments that seek to manage the entire national economy. With a gold standard you can plan for the future, in your business, for yourself, for your family . . . you can enjoy again the almost forgotten security of Economic Freedom.

YOU GET MORE
from Less Kennametal

Ask our representatives to demonstrate Kennametal . . . the tooling that reduces costs and increases productivity.

KENNAMETAL
SUPERIOR CEMENTED CARBIDES
KENNAMETAL Inc. LATROBE PA

YOU GET LESS
from More paper money

Ask your Congressman if he is for or against the Reed Bill HR324. You and other voters must know.

down or across the table. Simultaneous operation of these drives allows diagonal welding at any angle.

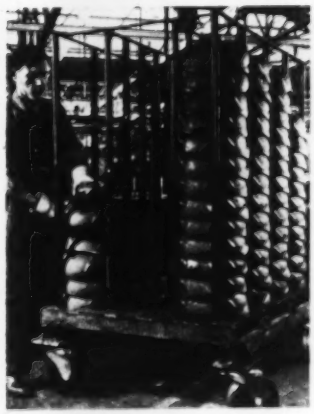
Automatic Unionmelt apparatus, made by Linde Air Products Co., division of Union Carbon & Carbide Corp., New York, is used for the welding operation. Machine controls feed and guides welding rod and granular composition along the joint. These require a minimum of operator attention. Vacuum system, mounted on the gantry, picks up unused composition and returns it to the hopper for reuse. Clutches in the drive mechanism and chipping hammers are compressed air operated.

Posters Feature Truck Safety

Towmotor Corp., Cleveland, has augmented its plant safety kit containing literature emphasizing safety in the use of materials handling equipment. Four new bulletin board posters are added.

Plant safety kit consists of traffic markers, safety instructions for Towmotor operators and humorously illustrated bulletin-board safety tips. Four posters, just released,

Rack Trucks Reduce Rehandling



TAILOR-MADE convenience is the feature of these specially built caster trucks used at Westinghouse Electric Corp.'s Buffalo Works. Pin type rack holds 300 brackets for Life-Line motors. Much rehandling is eliminated since racks are loaded directly from finish bearing boring machines. Truck can be moved easily to motor assembly area as needed

Best way to keep a Head

Vapor-from-Paper STOPS RUST — Now Cost of Protecting Diesel Cylinder Heads is Cut from $4.70 to $1.31

You're looking at a revolutionary way to keep a Diesel cylinder head from rusting.

A leading locomotive firm used to dip heads in an inflammable cleansing liquid. Then moisture had to be removed. This called for cranes and fire precautions. Dried with an air hose, this cylinder head was dipped into a varnish-like solution. To keep the sticky coating in place, waxed paper and heavy wooden boxes were "musts". Unpacking involved the same troubles in reverse. A couple of hours with a scrubbing brush came before the head could be installed in a Diesel.

Today, vapor-from-paper stops rust! This magic-like paper is Angier VPI* Wrap. It gives off an invisible protective vapor that is clean . . . SAFE! As the vapor permeates into deepest cavities, both air and moisture are made harmless to shiny cylinder heads. No grease or oil is necessary. Now packaging costs are down to $1.31 from $4.70. And this doesn't include an average freight savings of 24% on the thousands of different locomotive parts that now are VPI-protected. All parts are ready to use when received . . . a godsend to men in the repair shops. No bulky equipment is required, so valuable floor space is saved.

If you ship or store metal parts or products, Angier VPI Wrap is meant for you! It may be used as a box liner or an envelope as well as a container insert. For "VPI Facts", write to the most experienced name in vapor rust preventives . . . Angier Corporation, Framingham 8, Mass.

Angier

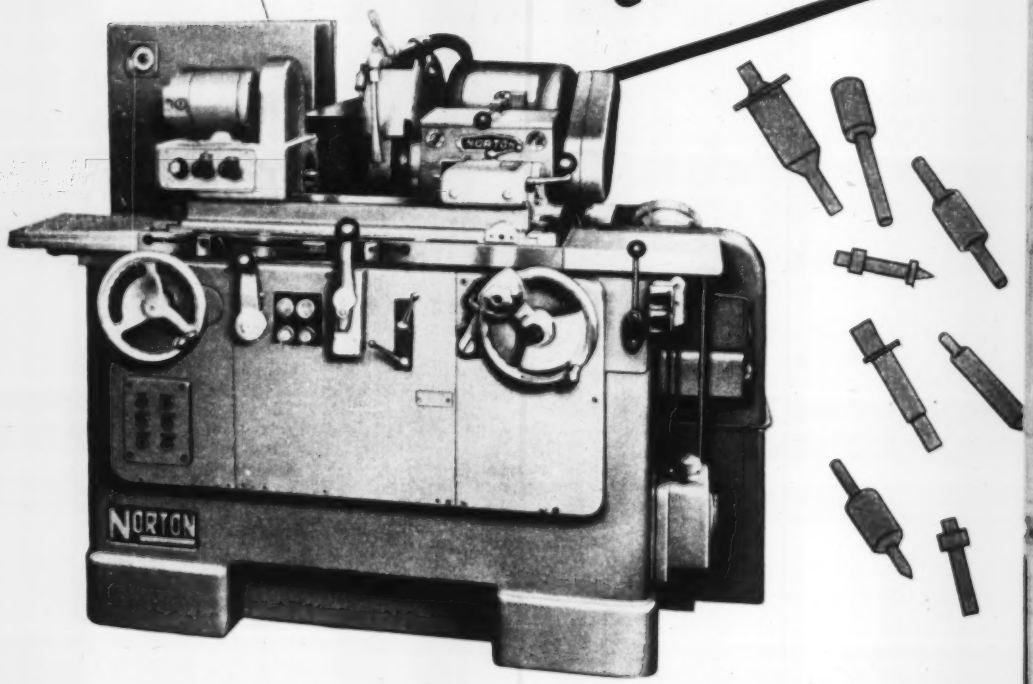
VPI* WRAP

Sold Nationally Thru Distributors . . . Who Also Sell Angier Reinforced "Snake Tape"; "Indorrap" — the Original Grade A Greaseproof Barrier; the new Angier Glass Wrap, A-G-W and Other Protective Papers.

* ℞ Vapor Rust Preventive

HIGH PRECISION plus

NEW NORTON 4" TYPE CTU CYLINDRICAL GRINDER



Available as either Semiautomatic or Plain Grinder

Making better products to make other products better

NORTON COMPANY, WORCESTER 6, MASS., U. S. A.

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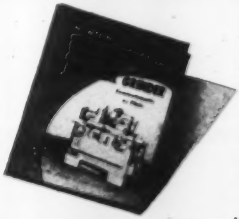
HIGH PRODUCTION!

For precise cylindrical grinding of small parts, you can purchase the newly designed NORTON 4" Type CTU as a Plain Machine for high production in traverse grinding, or as a Semiautomatic Machine for high production in plunge grinding operations. Both machines are available in either 12" or 18" work length capacities.

From either the Plain Machine or the Semiautomatic you will not only get rapid, accurate grinding action—you will benefit as well from the advanced degree of operating ease they offer. Automatic features in their functioning will help you achieve consistency in output, and permit the operator to devote a major share of his attention to loading duties.

The extreme ruggedness of the wheel spindle unit assures enduring precision whether fine finishing or heavy stock removal jobs must be performed. Dependability under heavy service—plus the other proved advantages of the NORTON Type CTU line of machines—brings a return on your investment sufficiently high to convince your company that "to modernize is to economize."



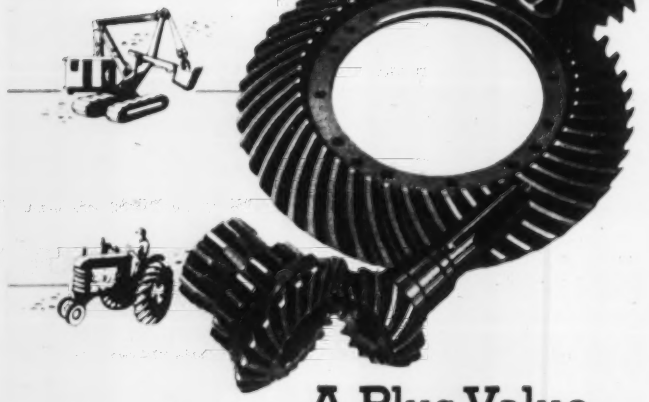
Catalog No. 531 gives additional details. Write for your copy today.

To Economize Modernize with NEW

NORTON

GRINDERS and LAPPERS

GEARS *by Fairfield*



A Plus Value in Any Product!

IF GEARS are a part of the machines you make, there is no finer recommendation for YOUR PRODUCT than to be able to say it is "Equipped with FAIRFIELD GEARS!"

At Fairfield, your gears are in the hands of specialists equipped with every modern facility for producing fine gears efficiently and economically. *For the Best in Gears, Specify Fairfield!*

Gears made to order:

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STRAIGHT BEVEL • HYPOID • ZEROL • WORMS and
WORM GEARS • SPLINED SHAFTS • DIFFERENTIALS

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Send for Illustrated Brochure

feature basic safety fundamentals in use of lift trucks. Posters are available without charge from the company.

Text Gives Servo System Data

Servomechanical devices used to control modern armament are described in a 253-page text, published by the Navy and made available to industry. Prepared by William J. Deerhake and Albert C. Hall of Massachusetts Institute of Technology, the treatise includes schematic diagrams, photographs and graphs to illustrate the applications made.

Text presents basic terms and definitions used in the servo-mechanics field, explaining major components, operational phenomena and characteristics. It deals exclusively with the systems used for automatic positioning. Other types, such as those used for automatic flow control, are omitted. For clarification, servo system behavior is explained by analogy with the actions in electrical circuits.

Instrument Servomechanisms sells for $2.00 a copy. Orders should go to Office of Technical Services, U. S. Department of Commerce, Washington 25.

Conversion Chart Offered

Engineers will find useful a combined conversion and decimal equivalent chart compiled and published by Frederick Post Co., Chicago. One side of the 17x22-inch reference shows inches converted to feet and metric equivalents; on the other side are listed the standard decimal equivalents. Copies are available free from the company's distributors or from the home office: 3650 N. Avondale Ave., Chicago 18.

Identifying Metals For Scrap

Development and research division of International Nickel Co., has outlined some simple tests for the identification of more than 125 metals and alloys in a revised edition of "Rapid Identification of Some Metals and Alloys." Included in booklet are procedures for identifying both wrought and cast ma-

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THIS QUALITY LINE OF MOTOR CONTROLS

Here is a complete line of motor controls—manual or automatic. It has established a universal reputation for being trouble free. That is why so many machinery manufacturers find that Allen-Bradley Motor Controls are such a valuable sales asset to their motorized machines.

The Allen-Bradley Handy Catalog is a convenient buying guide for the dependable motor controls shown on this page. Please send for this 92-page illustrated manual on a-c and d-c controls and accessories. It lists a wide variety of motor controls with dimensions and prices.

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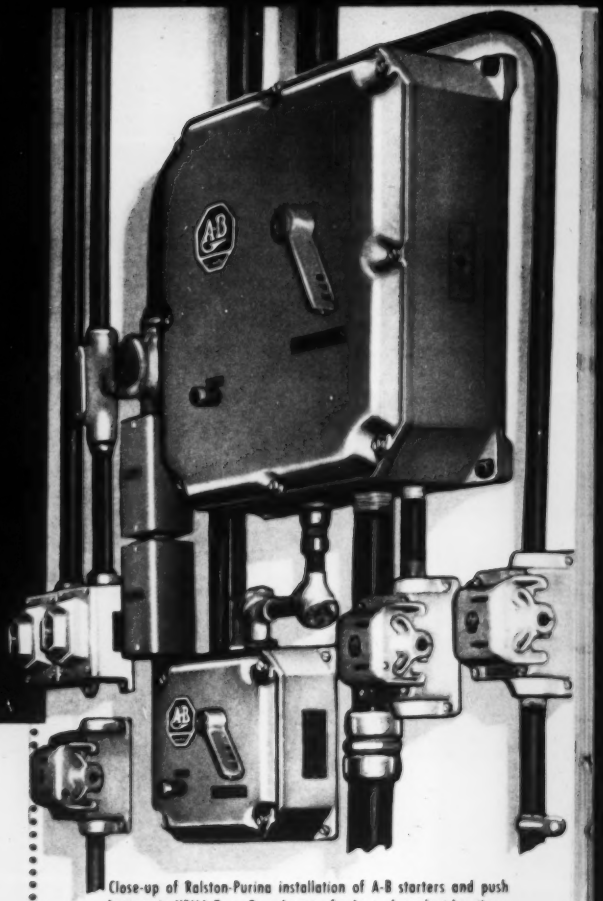
MOTOR CONTROL

QUALITY

ENCLOSURES are IMPORTANT

Avoid COSTLY maintenance by using the right enclosure for every job



Close-up of Ralston-Purina installation of A-B starters and push buttons in NEMA Type 9 enclosures for hazardous dust locations.

It pays out . . . in lower maintenance, fewer shutdowns, and greater production . . . to use the correct enclosure for each motor starter.

Some installations need waterproof or weatherproof enclosures. Others require cast iron cabinets to prevent explosions in dusty atmospheres. For bad corrosive conditions, oil immersed starters may be essential. Of course, for normal applications, the general purpose pressed steel enclosure with bonderized and black enameled finish is popular.

You can always find the right enclosure in the Allen-Bradley line to protect your plant, personnel, and production schedules.

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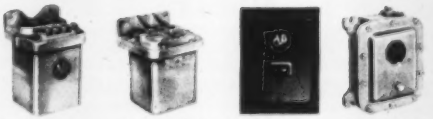
THERE IS A STANDARD ENCLOSURE FOR EVERY TYPE OF INDUSTRIAL SERVICE

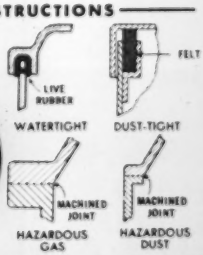
General Purpose | Dust-tight | Watertight | Dust-tight



Corrosion Proof | For Hazardous Locations | Flush Mounting | For Hazardous Locations

TYPICAL CONSTRUCTIONS

Sectional Views of Cover Seals



ALLEN-BRADLEY

TROUBLE FREE MOTOR CONTROLS

REPUBLIC

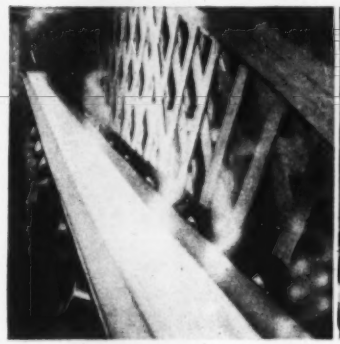
HOT MATERIAL conveyor belting

Put your hot cargoes on Republic Hot Material Conveyor Belts! That's the sure way to end costly breakdowns and maintenance bills resulting from high temperature exposure.

Republic Hot Material Conveyor Belts are made with special carcass fabrics imbedded in and covered with insulating rubber, specially compounded for resistance to heat, cutting and abrasion. Chances are there's a special Republic Hot Material Conveyor Belt already built for your specific job requirements. If not, 52 years of product development experience are at your service.

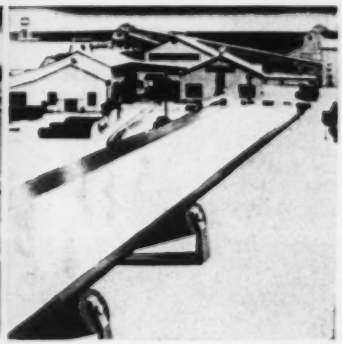
Your local Republic Distributor can help you decide whether you need duck, asbestos or glass ply construction. Contact him today or write today for full facts.

hot material handling without breakdowns!!



At the Carbon Limestone Company, Hillsville, Pennsylvania, pulverized limestone leaves a series of crushers, screens and heat dryers and drops stinging hot upon this Republic Rubber-Glass Belt. The work is continuous. But despite temperatures that exceed 300°F., up to 80 tons of material are handled during a single hour without harm to the belt.

This Republic Rubber-Glass Conveyor Belt carries tons of smoldering sand for one of the world's biggest foundries. Temperature of the sand runs as high as 400°F. Mixed within the sand as it travels from shakeout racks to reclaiming stations are red-hot pieces of jagged metal. Despite the difficult work conditions, this Republic Rubber-Glass Conveyor Belt is giving ten times more service than the belt it replaced!



International Minerals & Chemical Corporation uses Republic Super Excelo Hot Material Belting to carry hot potassium salts through their Carlsbad, New Mexico, plant. The belt operates 20 hours per day. The load runs an average 325°F. temperature, yet the belt's performance record is considered to be "excellent."

Sure way to Beat the Heat!!

INDUSTRIAL RUBBER PRODUCTS BY

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LOW COST
IRIDITE
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for zinc, cadmium, aluminum and cuprous metals

provide
corrosion resistance
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And they are easy to apply! Just a simple chemical dip for only a few seconds produces the coating

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combine to make Iridite the most economical chromate finish you can buy. Many Iridite chemicals are packed in powder form, thus can be shipped to you in steel pails at freight savings of up to 75%! Pails take less storage space, are easier to handle, eliminate carboys, need not be returned.

WHY NOT TEST IRIDITE ON YOUR PRODUCTS? Write for literature and send samples for free test processing. See "Plating Supplies" in your classified telephone directory or write direct.

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terials—from alloy cast irons like Ni-Resist and nickel alloy steels, to precious metals and their alloys.

Copies of the booklet may be obtained by writing the Technical Service Section of the company, New York 5, N. Y.

Lamps Operate on 360 Cycles

Lighting technique using fluorescent lamps operating on 360 instead of the conventional 60 cycles was applied by General Electric Co. engineers at the U. S. Department of Agriculture's Plant Industry Station, Beltsville, Md. A major benefit reported is a 40 per cent increase in the amount of light available from the 88 slimline lamps. This is accomplished by operating at a higher current than would be practical at 60 cycles.

Another important advantage attributed to the method is that it makes possible substitution of tiny capacitors weighing only a few ounces for large conventional bal-

Power for Big Digging Jobs

CAPABLE of loading trucks of the 50-ton class in three or four passes, this 10-cubic yard shovel built by Marion Power Shovel Co., Marion, O., is basically a full electric machine with Ward-Leonard controls. Equipped with either Amplidyne or Rotorol high speed electric controls it is capable of operating speeds that would otherwise be impractical in a large, heavy assembly. For use in areas where electric power is not available, the 191-M can be furnished as a diesel-electric unit like the one shown here

Morse ...leading producer of precision-built chain drives

MORSE SILENT CHAIN DRIVES

Industrial type: Morse Industrial Silent Chain Drives are quiet, smooth-running, reliable. They give long years of efficient service with fewer service interruptions.

Automotive type: Morse Automotive Silent Chain Drives are precision-made, mass-produced. The experience and production facilities necessary to supply thousands of these drives daily enable Morse to supply highest-quality, economical industrial drives.

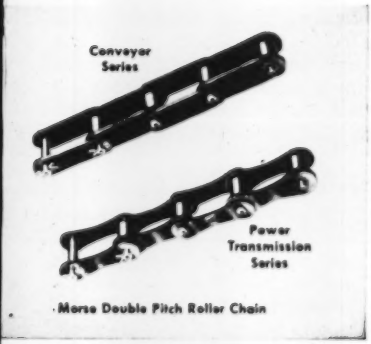
MORSE STANDARD ROLLER CHAIN DRIVES

Morse Standard Roller Chain Drives are 99% efficient. They use teeth, not tension; won't slip.

Morse Standard Roller Chains are available from distributors' stock from ¼" pitch to 2½" pitch, with horsepower capacities ranging from less than 1/10 H.P. to extremely heavy horsepower applications using large-pitch, multiple-strand chains. Corresponding sprockets available in types A, B, and C.

MORSE HY-VO DRIVES

Sensational, proved Morse Hy-Vo Drives transmit more horsepower at higher speeds and lower cost than any other standard power transmission drives. They cut operating costs per hour up to 50%, operate 45% more quietly, give up to one-third longer service life. Morse Hy-Vo opens the way to transmitting far more horsepower from smaller, faster engines —without costly outboard bearings and mounts.



MORSE DOUBLE-PITCH ROLLER CHAINS

Morse Double-Pitch Roller Chains give positive drive. They cost less, weigh less, and give long life comparable to that of standard roller chains. Single and double-duty sprockets available.

MORSE CABLE CHAINS

Precision-built for heavy-duty service. Standard pitches from ½" to 1", with average ultimate breaking strength of from 3900 pounds to 49,000 pounds.

For information on any of these precision-built power transmission chains or chain drives, write Morse direct or phone your Morse distributor.

MORSE CHAIN COMPANY
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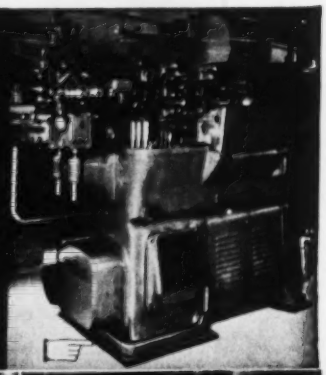

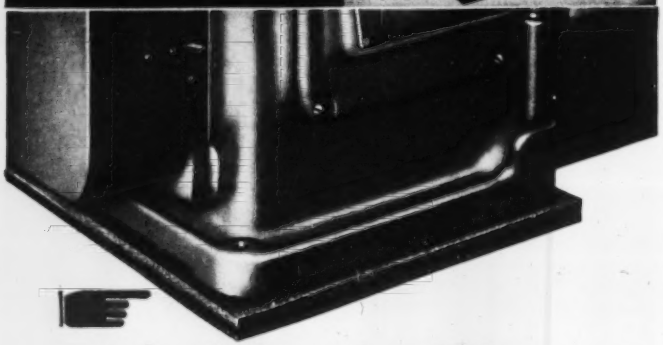

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This leading clock manufacturer cut installation time materially when UNISORB machine mounting came into the picture.

They cut transmitted machine vibration 60% to 85%.

They eliminated the need for old-fashioned, destructive floor-drilling in most instances—*because UNISORB requires no bolts or lag screws.*

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lasts that weigh several pounds. Before the high-frequency type system was available, total weight of ballasts for one laboratory room was about 800 pounds. On the 360-cycle installation, low loss capacitor ballasts weigh 44 pounds and the heat and space problem of the larger type is eliminated.

Magnetic converter used steps up current to high freqencies like a transformer steps up voltage. A substantially maintenance - free method, it has no rotary equipment or electronic tubes.

Twist Keeps Ore Belt Clean

Rubber belt conveyor system that overcomes operating hazards of subzero weather is operating at iron mines near Ishpeming, Mich. Developed jointly by B. F. Goodrich Co., Akron, and Chain Belt Co., Milwaukee, the system uses an arrangement that turns the belt over after the load is delivered.

This twist makes the belt's clean side always run on top of the return idlers. It cannot clog or cause damaging buildup of tacky materials on rotating metal parts. Before accepting another load, the belt takes another 180 degree twist, returning to its original carrying surface.

Turnover action is accomplished by positioning two twist pulleys at each end of the system. Any conventional belt conveyor can be converted in this manner. Its application lessens clean-up problems resulting from spillage; deck plates to protect the return run are eliminated. Spillage onto the lower run is carried to the tail end and dumped automatically for subsequent reclaiming.

Bulletin Aids Punch, Die Care

"How to Save Money on Punches and Dies" is the title of a 16-page publication offered by F. J. Stokes Machine Co. Brochure gives a broad summary of ways and means to keep punches and dies in condition to work best at highest efficiency. Separate sections are devoted to: Regular care, handling, mechanical contact, cleaning, storage, what to do about wear, lubrication in service, and overloading of punches and dies. Also given

Alloy savings

PAY FOR AJAX-NORTHRUP FURNACES

in three years

Induction melting saves tons of ferrochrome a month in one east coast stainless steel foundry . . . metal that was previously "burned up" in other electric furnaces.

With a three shift monthly melting capacity of 1,000,000 pounds, a 2% reduction in chromium losses made the difference. Dollar savings up to $60,000 a year are enough to pay for the equipment in a year and a half—three years on a reduced schedule.

This is only the beginning—savings in other critical and expensive alloys are also appreciable. Here are typical metal recovery figures from another Ajax-Northrup foundry melting 18-8 stainless:

Ni:	100%	Cr:	99%	Mn:	90%
Si:	94%	Mo:	95%	Cb:	92%

Besides saving metals, Ajax-Northrup furnaces melt at high speed, with extremely close control of analysis and temperature. A typical foundry, with never more than one 600-pound furnace in operation on a two shift basis, pours almost 250,000 pounds of high-melting point alloys a month. Pouring temperatures are controlled within 20°F, composition of every element within 0.25%.

Performance like this can save critical alloys for you, too. Whether you melt 8 ounces of platinum, or 8 tons of steel, write us today.

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FOR HEATING AND MELTING

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AJAX PARK
TRENTON 5, NEW JERSEY

for **BORON STEELS**

GRAINAL TREATMENT
meets new specifications

To meet the requirements of boron-treated steels, use Grainal Alloys—metallurgically engineered multiple-element ferro-alloys containing boron.

The combination of elements in these alloys is *most effective* and produces *extremely uniform* results in raising the hardenability of very low alloy steels.

Nominal compositions of three grades available:

Vanadium Grainal No. 1		Vanadium Grainal No. 6		Grainal No. 79	
Vanadium	25.00%	Vanadium	13.00%	Aluminum	13.00%
Aluminum	10.00%	Aluminum	12.00%	Titanium	20.00%
Titanium	15.00%	Titanium	20.00%	Zirconium	4.00%
Boron	0.20%	Boron	0.20%	Manganese	8.00%
				Boron	0.50%
				Silicon	5.00%

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MAKERS OF ALLOYS
VANCORAM
CHEMICALS AND METALS

is a list of do's and don'ts for handling rotary punches, rotary dies, single punches, and single punch dies.

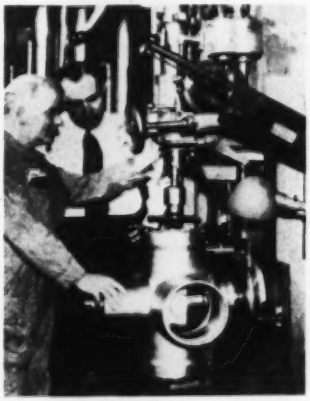
Publication may be obtained in any desired quantity by writing the company at 5500 Tabor Rd., Philadelphia 20. Request bulletin No. 610.

Tests Show Airfoil Efficiency

Prospects may be good for an increased use of airfoil bladed fans, despite their greater initial cost. This conclusion is the result of witness tests by Westinghouse Electric Corp., Pittsburgh, that rate mechanical efficiency of airfoil blading at 92 per cent, compared with 84 per cent for conventional bladed fans. In addition, data show the new fan to be quieter, developing about 65 per cent less noise energy than conventional types. Tests were conducted by the company's Sturtevant Division, on a scale model centrifugal fan wheel.

Centrifugal fan blades are usually simple rectangular metal plates, flat or curved, welded in the rotat-

Drill Press Makes Brushing Tool



CONVERTING a drill press into a high speed production brushing machine saves Propeller Division, Curtiss-Wright Corp. nearly $20,000 in equipment and considerable production time. Consultation with engineers from Osborn Mfg. Co., Cleveland, developed this method for improving the finish on a small bearing area in the hub of variable pitch propellers. Operation removes particles of fragmented metal and smooths peaks left on the diameter

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"Tool life increased from 6 to 50 times with Standard Carboloy Tools and Blanks!"

*says supervisor of large eastern plant**

Tool life increased from 6 to 50 times! Piece production almost doubled on many jobs! These and other plant-wide results gained through using Carboloy "Standards" led the planning supervisor of a large eastern company to say, "We couldn't operate without Standard Carboloy Tools and Blanks."

Many other manufacturers report equally outstanding results from long-wearing Carboloy "Standards." Their consistent *high quality, uniform performance* and *adaptability* make them first choice with carbide users everywhere . . . for top production, fewer downtime hours, large savings on tool and tool maintenance costs.

Only 11 styles of fast-cutting, cost-cutting Standard Carboloy Tools can do 80% of your single-point machining jobs . . . either used "as is" or by quickly adapting them in your own tool room for turning, boring, facing, milling, chamfering, grooving, threading and forming.

And the jobs that Standard Tools can't be adapted to can most likely be handled by Standard Carboloy Blanks . . . made in many hundreds of shapes and sizes; easy to braze and grind to fit your needs. With ample Blanks on hand, you'll be ready to roll on most rush jobs . . . without delays.

For your convenience, Authorized Carboloy Distributors in your area normally maintain stocks of the most commonly used sizes of Standard Carboloy Tools and Blanks. See the Distributor nearest you (listed at right) next time you need versatile, fast-cutting cemented carbides.

For information about Carboloy Services . . . or for the latest catalog on styles, sizes and shapes of Standard Carboloy Tools and Blanks, see your nearest Authorized Carboloy Distributor or write direct.

**Name of eastern company will be furnished on request.*

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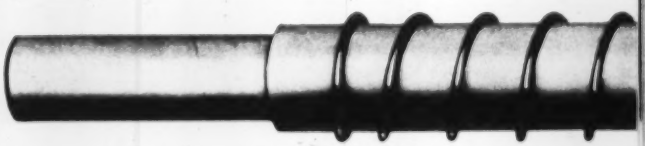
Booth No. 539
A.S.T.E. CONVENTION
Chicago, March 17-20

FREE CARBIDE SERVICES

To help you get peak results and extra savings from carbides, the Carboloy organization offers an all-inclusive service program to train your employees. Free technical data, manuals, catalogs, charts, engineering assistance and even a tuition-free Customer Training School are included in the program.



"Carboloy" is the trademark for the products of Carboloy Department of General Electric Company

CARBOLOY

DEPARTMENT OF GENERAL ELECTRIC COMPANY

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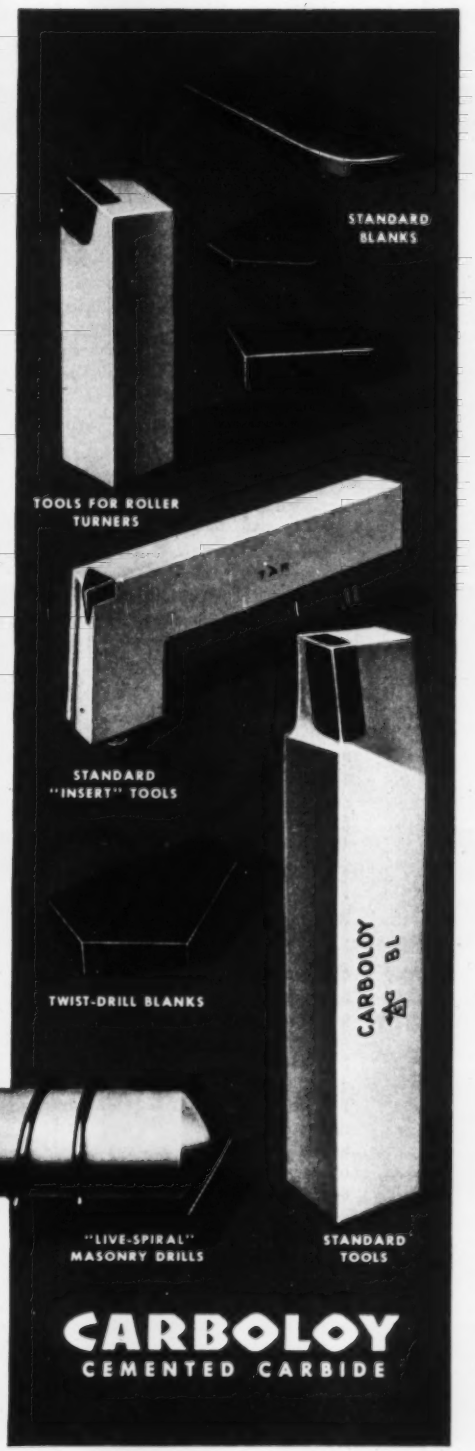

Authorized Carboloy Distributors

STANDARD CARBOLOY TOOLS and Blanks are made in a large variety of styles, shapes and sizes. They are easy to stock . . . eliminate the need for heavy, costly inventories. Order them—and "specials," too—from your Authorized Carboloy Distributor.

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Birmingham—Young and Vann Supply Co.

ARIZONA
Phoenix—McConkey-Docker & Co.

CALIFORNIA
Los Angeles—Garrett Supply Co.
Los Angeles—Machinists' Tool & Supply Co.
Oakland—C. W. Marwedel
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COLORADO
Denver—Mine & Smelter Supply Co.

CONNECTICUT
Bridgeport—Hawley Hardware Co.
Hartford—Silliter-Holden, Inc.
New Haven—White Supply Co.
Waterbury—White Supply Co.

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Miami—Cameron & Barkley Co.
Orlando—Cameron & Barkley Co.
Tampa—Cameron & Barkley Co.

GEORGIA
Atlanta—Pye-Barker Supply Co.
Savannah—Cameron & Barkley Co.

ILLINOIS
Chicago—Samuel Harris & Co.
Chicago—Screw Machine Supply Co.
Rockford—Samuel Harris & Co.
Waukegan—Samuel Harris & Co.

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Fort Wayne—Tools & Abrasives, Inc.
Indianapolis—Tools & Supplies, Inc.
Indianapolis—Vonnegut Hardware Co.
South Bend—South Bend Supply Co

IOWA
Davenport—Davenport Engineering Co.
Sioux City—Sioux Machinery & Supply Co.

KANSAS
Wichita—Ellfeldt Machinery & Supply Co.

LOUISIANA
New Orleans—Murray-Baker-Frederick, Inc.
Shreveport—Frederick & Baker

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Baltimore—W. L. Reynolds Co.

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Worcester—Brierly, Lombard & Co., Inc.

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Detroit—Chas. A. Strelinger Co.
Detroit—Sterling Supply Co.
Flint—Geo. W. Hubbard Hardware Co.
Grand Rapids—A. L. Holcomb Co.
Jackson—C. E. Hamlin Co.
Kalamazoo—Kendall Hardware-Mill Supply Co.
Lansing—Mill Supplies Corp.
Muskegon—Muskegon Hardware & Supply Co.

MINNESOTA
Minneapolis—John C. Eide Co

MISSISSIPPI
Jackson—J. E. Dilworth Co.

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St. Louis—Tools & Supplies, Inc.

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OHIO
Akron—Service Tool & Supply Co.
Canton—Service Tool & Supply Co.
Cincinnati—E. A. Kinsey Co.
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Oklahoma City—Marshall Supply & Equip. Co.
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OREGON
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PENNSYLVANIA
Allentown—Wm. H. Taylor & Co., Inc.
Erie—Erie Mfg. & Supply Co.
Harrisburg—Raub Supply Co.
Lancaster—Raub Supply Co.
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Chattanooga—Mills & Lupton Supply Co.
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Memphis—J. E. Dilworth Co.

TEXAS
Dallas—Briggs-Weaver Mach. Co.
Dallas—Tool Supply & Engineering Co.
El Paso—El Paso Saw & Belting Supply Co.

UTAH
Salt Lake City—Mine & Smelter Supply Co.

VIRGINIA
Norfolk—Empire Mach. & Supply Co
Richmond—Industrial Supply Corp.

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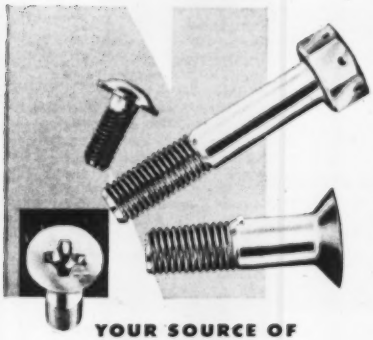

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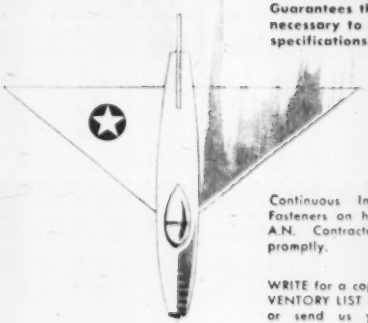

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ing element. In the airfoil fan, blade cross-section is similar to an airplane wing cross-section—teardrop shaped and curved backward from its direction of rotation. Such a blade exerts positive pressure over its entire length, from leading to trailing edge. As a result, air flow is smooth, with a minimum of turbulence.

Airfoil blades are more costly because each is a hollow steel shell with supporting struts welded longitudinally inside. Efficiency in horsepower savings during write-off must be the factor that repays the premium in initial cost.

Cathodic System Shields Piping

Graphite anodes and a totally oil-immersed explosion proof rectifier provide cathodic protection for 2200 feet of underground piping at the Wilson & Co. hydrogen plant at Oklahoma City, Okla. In making the installation, Cathodic Protection Division, Harco Corp., Cleveland, bonded all plant piping together to make one complete electrical circuit for protection by a single system.

In operation, the rectifier impresses a direct current on the anodes. Current radiates through backfill material and soil to metal pipe surfaces, opposing and counteracting electrochemical action that causes corrosion.

Bushing Increases Nozzle Life

Use of a Carboloy cemented carbide bushing inside conventional feed nozzle tips for automatic arc welding increases tip life up to 20 per cent. Wear is no longer a problem and burning effect is greatly reduced, reports General Electric Co., as a result of work done at the Ft. Wayne, Ind., works. The company says an attendant benefit is ability to maintain a more uniform narrow weld, since accurate wire guidance, difficult when wear developed, is no longer a problem.

Two other improvements are made with cemented carbide to further reduce downtime and maintenance on arc-welding equipment. In the first, a carbide guide ring is added inside the fiber guide that keeps the electrode wire from riding off the overhead pulley. This

HOLES

where you want them!

Whenever your work involves punching holes in hard-to-get-at or irregularly spaced locations—there's another place where Hannifin "Hy-Power" Hydraulics can help you. This portable equipment with its variety of work tools can bring forces up to 100 tons (more in multiple) to the work as needed.

For instance . . . here a "Hy-Power" punch makes rivet holes on an accurate, easy and fast basis. Then, similar "Hy-Power" work tools take over for riveting. The Hannifin "Hy-Power" riveter cold-sets rivets to stay—quietly, at extremely low cost. This fast, finger-tip controlled operation squeezes each rivet to fill the hole completely . . . forces riveted members tightly together, work hardens the rivets . . . makes strong joints.

But "Hy-Power" Hydraulics are not limited to riveting. The basic high pressure "Hy-Power" generator and portable work tools are widely adapted for punching, forming, bending.

"Hy-Power" *portable punching on furnace radiator shell.*

"Hy-Power" *portable riveting on an assembly operation.*

WHAT IS "HY-POWER"?

The "Hy-Power" generator—heart of the "Hy-Power" Hydraulic System—combines motor, pump, oil reservoir, control valves and high pressure intensifier into a compact, self-contained unit to power production tools.

DESIGN ENGINEERS, TOOL SPECIALISTS

Investigate versatile "Hy-Power" equipment for your plant production operations. Write for "Hy-Power" Hydraulics Bulletin 150. Hannifin Corporation, 1123 S. Kilbourn Ave., Chicago 24, Ill.

do ALL you CAN do . . . with

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"Hy-Power" Hydraulics • Hydraulic Presses • Air Cylinders • Hydraulic Cylinders • Pneumatic Presses • Air Control Valves

Machining valves from high speed steel and copper on automatics, a well-known Ohio firm found coolant costs excessive, running around $1200 monthly. Antisep mixed 1 part to 25 parts water was recommended. Costs dropped to $225. "Yes, we're saving almost $1000 a month by changing to Antisep cutting base," this manufacturer reports. "And the finish and tool life we get is equal to results when using expensive straight cutting oils."

Users are finding Antisep handles better than 90% of their metal cutting jobs. You'll stock *one* instead of many cutting oils for general machining work—automatics.

You'll dilute this efficient all-purpose base as much as 30 to 1 with plain water. You'll save space and simplify selection. You'll reduce machining costs substantially and yet handle the toughest operations. Try a drum or two and prove it.

If you want further information—or would have us arrange a convincing test in your plant—write to E. F. Houghton & Co., Philadelphia 33, Pa. We'll also send you the booklets mentioned at left.

GET THESE NEW BOOKLETS

—without charge! "Houghton Defense Production Data" is a 52-page record of heat-treating and machining experience in processing armament, based on extensive metalworking experience. Particularly valuable to plants switching to defense production. Write for your copy. We'll also send you the new 32-page booklet on Antisep Base, "Getting Down to Cases on Metal Cutting," which proves Antisep's performance.

ANTISEP

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Ready to give you on-the-job service . . .

eliminates danger of short circuits from wire wearing through fiber insulation and contacting metal supporting arm.

Final application is made at the guide block that locks the electrode wire in position against conical feed rolls. Tipping the block with a standard carbide blank cuts wear and avoids impaired positive feeding.

Hard Mower Blades, No Warpage

Entire blade assemblies for lawn mowers are hardened by a three-phase austempering treatment at Reo Motors Inc., Lansing, Michigan. Blade assembly consists of

CONVEYORIZED AUSTEMPERING
. . . hardens without warpage

a center shaft to which 5 stamped spiders are welded, and 5 helical shaped blades attached to each spider by two rivets. Critical aspect of the heat treating operation is the necessity for hardening the parts without warpage and the avoidance of stresses which might result in subsequent warpage of the assemblies in service.

For maximum speed and efficiency, the heat treating operation is entirely conveyorized. Assemblies are hung on a carrier in groups of six. For the first step, they are circulated through a Holden salt bath furnace. Bath is a mixture of potassium and sodium chloride held at a temperature of 1550 to 1575° F. Time cycle is 6 minutes.

At the end of this time, the

need help on
steel strapping methods?

IT'S no coincidence that Donald Dougherty, Brainard Strapping System representative in Philadelphia, is showing this customer the proper use of a heavy-duty strapping tool.

Brainard's catalog lists over 1,000 items of steel strapping, tools, and accessories. It's the job of Don and his fellow Brainard representatives to see that the right equipment is applied to your operations.

And if you have an extra-tough problem, your Brainard man will bring factory engineers into your plant—pronto. They'll study your packaging, shipping, or handling methods . . . make recommendations . . . work out the specifications for you.

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Please send new catalog listing specifications of strapping, tools, and accessories.
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Why not find out whether we can help reduce costs beyond what you have worked out for yourself, or that somebody else has worked out with you?

In plant after plant, our Field Engineers have achieved splendidly. Given the opportunity, they'd probably add solution of your problems to their impressive lists of successes.

With their analyses of your objectives in hand, our laboratory technicians can produce *specific purpose* grinding wheels that will assure you an efficiency that will result in a wholly new degree of economy for you.

May we, at our risk, undertake to prove it?

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Electro
SPECIFIC PURPOSE GRINDING WHEELS

blade assemblies are conveyed through a nitrate salt bath held at 575 to 600° F for another 6 minutes. After a short cooling period, the parts get a wash in cold water, then immersion in a 70 degree alkali rinse which produces a degree of rust resistance.

Pipeline Speeds Nickel Process

Transporting nickel-copper concentrate by pipeline cuts production time costs through the entire nickel refining process, reports International Nickel Co. Inc., New York. The 7½-mile line pumps bulk concentrate from 3,650,000 tons of ore annually from the company's new Creighton concentrator to its reduction plants at Copper Cliff, Ont.

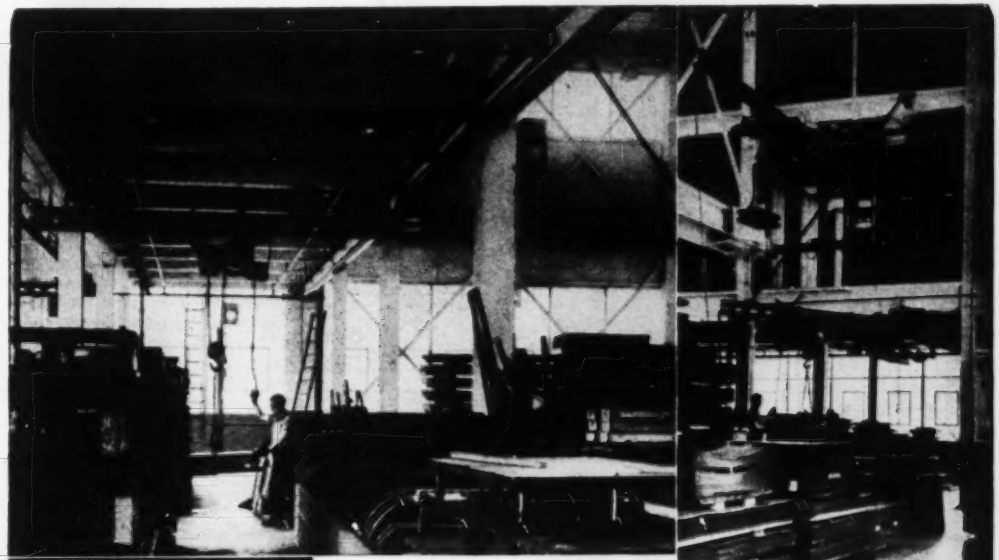
Part of a $130 million underground mine expansion program, this artery is an integrated system that also carries tailing from both Creighton and Copper Cliff to a disposal area midway between. The system has 12 miles of trestle, at some points 65 feet high. This assures a slope to and from each of the five relay pumping stations so concentrate line will be self-draining in case of power failure. Lumber used totals 3 million board feet, plus an additional 40 miles of wooden pipe.

About 1800 tons of concentrate and 8200 tons of tailing are produced from 10,000 tons of nickel-copper ore milled every day at Creighton. Water added to the concentrate makes a pulp that flows through the pipeline at a rate of 800 gpm. Tailing pulp flows at 2500 gpm.

Rectifier Article Published

"Metallic Rectifier Design and Application," article written by Julian Loebenstein of Radio Receptor Co. Inc., is available in booklet form. Booklet is illustrated with application photographs, drawings, diagrams and charts. Article reviews the background of metallic rectifiers and clarifies the various factors in their application to electronic circuits.

Also included is a helpful glossary of terms. Booklet is available upon request to the company, Seletron Rectifier Division, 251 W. 19th St., New York 11.



...Unique Tramrail Layout

...Solves Handling Problem

The problem of handling heavy dies in the plant of a large electric motor manufacturer was solved by a combination of standard Cleveland Tramrail transfer bridges and swinging jib cranes.

The dies are stored on the first floor at one end of the building and also on a mezzanine directly above. Two crane runways with interlocking transfer bridges and a jib crane are provided for the first floor and similar handling equipment for the mezzanine. The equipment for the first floor is of 3-tons capacity because the heaviest dies are stored there. Lighter dies are stored on the mezzanine and only one-ton equipment is required here.

The Cleveland Tramrail equipment makes it an easy job to deliver dies to and from any point on the first floor or the mezzanine. Since the areas covered by the swinging jib cranes overlap, loads may be easily transferred from first floor to mezzanine or vice versa.

The bridges and carriers are hand propelled since the effort required to propel them even when fully loaded is very little. The heavy lifting is done by push-button-operated electric hoists.

Cleveland Tramrail representatives are in a position to help you solve today's problems or develop plans for the future.

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protection for industrial workers
keeps you on the safe side
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Like these sturdy welding goggles, all Willson safety equipment is made after careful study of industry's needs. Through this continuing research you get many comfort and safety improvements first in Willson products. Ask for Willson—largest line of goggles and helmets for gas and arc welding.
COVER-ALL® GOGGLE
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Adjustable leather nose bridge for extra comfort. Ample room for prescription glasses.
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Weld lens lifts up to leave clear Super-Tough® lens in place for chipping and inspection.
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One-piece durable fibre shell with lift-up outer lens for quick inspection of work.

See your WILLSON distributor or write for bulletin
WILLSON PRODUCTS, Inc., 233 Washington St., Reading, Pennsylvania

New Books

Lubricants in Metalworking

METALWORKING LUBRICANTS—THEIR SELECTION, APPLICATION AND MAINTENANCE, by E. L. H. Bastian; cloth, 357 pages, 6 x 9 inches; published by McGraw-Hill Book Co., New York, for $6.00; available from STEEL, Penton Bldg., Cleveland 13, O.

This book is a comprehensive discussion of the lubricants and fluids used to secure more efficient operation in the working and processing of metals. Fluids used in forming nonmetallic engineering materials such as plastics, are also discussed. Practical know-how is given on the nature and formations of metalworking lubricants, the properties affecting their performance in specific operations, their proper use in the plant and the means of maintaining top efficiency of these lubricants under operating conditions.

Background information on theory of metalworking lubricants is supplied and on the job aid is given to the shopman and supervisor who are concerned with what lubricants to use and how to use them effectively. Recommendation charts, tables and practical operating views as given by plant engineers, foremen, etc., are presented.

While all types of lubricants used in actual metalworking processes and methods and devices for this use are the main theme of the book, various types and applications of machine lubricants such as bearings and gear oils, greases, etc., as they are applied to machine tools, presses, draw benches, forges, mills and other equipment are also discussed.

Covers New Credit Laws

CREDIT MANUAL OF COMMERCIAL LAWS; cloth, 848 pages, 6 x 9 inches; published by the National Association of Credit Men, New York, for $10.00; available from STEEL, Penton Bldg., Cleveland 13, O.

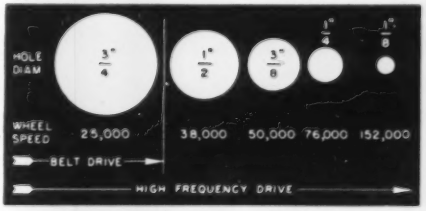
Purpose of each annual edition is to provide a finger-tip summary of the laws having a direct bearing on credit and financial operations. The large number of new statutes and amendments to existing laws of trade passed by 28 states during 1951 are presented in this 44th edition. The manual informs the financial executive on what to do and what not to do from the time the order is received by his company until the account is paid.

In addition to the summary of state laws, the book also covers the latest information about fair trade and price

What's in Vermont this month?

NEW WHEELHEAD REDUCES COST OF FINISHING SMALL HOLES. Surface speeds of 5,000 to 6,000 feet per minute are required to grind metal efficiently with present grinding wheels. To grind a hole $\frac{3}{4}$-inch in diameter, a $\frac{3}{16}$-inch wheel is used. To maintain efficient grinding speed this wheel must rotate at 30,000 R.P.M. This is about the maximum speed of a belt-driven spindle. But, to grind a $\frac{1}{2}$-inch hole, a $\frac{3}{8}$-inch wheel must turn at 50,000 R.P.M. The surface speed at maximum belt drive R.P.M. is only 3,000 feet per minute, or one-half the required speed. Grinding efficiency is lost; wheel cost is high; production time is high. If the spindle is run over 30,000 R.P.M., a new belt is needed once a day in some cases.

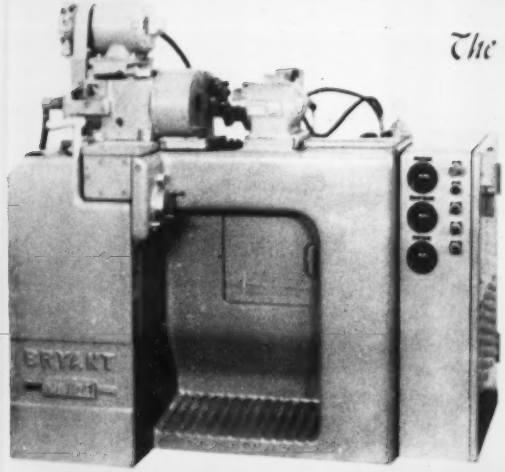
The Bryant Chucking Grinder Company in Springfield, Vermont, has developed a precision ball bearing wheelhead with a built-in Hi-Frequency electric motor. This wheelhead, having no belt, will run up to 100,000 R.P.M. It is designed for long life and high efficiency. Mist lubricated, preloaded ball bearings and a water cooled jacket assure continuous operation. Efficient grinding speeds are provided for hole sizes far below the present $\frac{3}{4}$-inch diameter; maximum wheel life is assured; belt costs are eliminated and "down time" is held to a minimum.



This is an example of how new developments in machine design can offset expenses in maintenance and perishable tools, and at the same time, increase production.

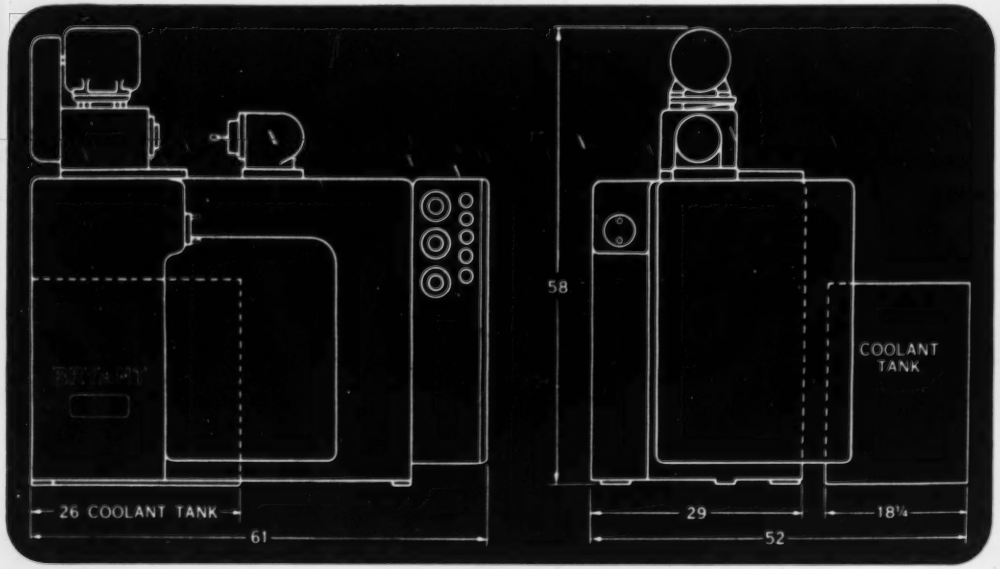
Bryant Chucking Grinder Company in Springfield, Vermont, U.S.A.

FOR HOLE GRINDING

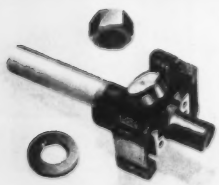


The Bryant 1109 Precision Internal Grinder

This semiautomatic machine is designed especially for grinding small bores. Although intended primarily for bore diameters of less than 1", it has a chuck swing of 9" and a maximum grinding stroke of 3½". By using preloaded bar slides for both cross and longitudinal slide movements, sensitivity is obtained without loss of rigidity. These rigid slides transmit the operating load directly to the base of the machine. The Bryant Hi-Frequency Wheelhead, providing speeds up to 100,000 R.P.M., is furnished as standard equipment to assure efficient surface speeds on the wheels necessary for grinding small bores. Write for further information.



FOR CHECKING INTERNAL THREADS



The Bryant Portable Thread Gage

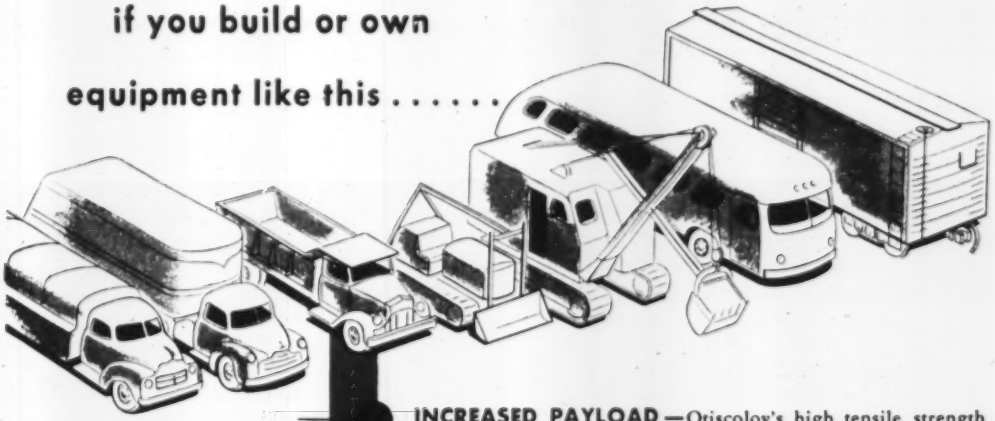
This is basically a split plug gage. Segments are collapsed and inserted into threaded hole. When expanded, they contact all threads. A partial turn of gage gives accumulated reading of P.D. form and lead on dial indicator — for the first time allowing parts to be sorted into known classifications for fit. *4 to 5 times faster than plug gaging.* Standard range from ¼" to 1" I.D. Write for complete details.

Bryant Chucking Grinder Company in Springfield, Vermont, U.S.A.

MAKE YOUR STEEL DOLLARS STRETCH

if you build or own

equipment like this . . . . . .



Here's what J&L Otiscoloy, the Transportation Steel, can provide

INCREASED PAYLOAD—Otiscoloy's high tensile strength permits the use of lighter sections without loss of strength — cuts equipment deadweight which allows for greater profit-paying cargo.

LOWER COSTS—Lighter sections with equivalent strength frequently make possible the production of 1/3 more units per ton compared with mild steel — result in 1/3 lower freight cost per unit — 1/3 less weight handled during production.

CORROSION RESISTANCE—Otiscoloy has 4 to 6 times greater resistance to atmospheric corrosion than mild steel — helps lengthen equipment service life — cut maintenance costs.

FATIGUE RESISTANCE—Otiscoloy has high resistance to fatigue — considerably greater than that of mild steel.

WORKABILITY—Otiscoloy can be easily welded or cold formed by any standard method.

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It's no surprise builders and users of transportation equipment are turning to high-tensile J&L Otiscoloy to give them machines that require minimum maintenance — help increase income through reduced deadweight and greater payloads.

When you're looking for new ways to cut costs on your equipment, you'll also find it well worth your while to check further into the advantages of J&L Otiscoloy, the modern transportation steel. Why not write us for additional information *today?*

JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH 30, PA.

maintenance laws as affected by the decisions of the United States Supreme Court. It gives the text of the 1951 amendments to the price and wage stabilization law and lists the location of the district offices charged with the operation of this new law and where to turn for the latest regulations. Manual also tells how to contact the Army, Navy and Air Force for defense contracts. New federal credit controls are covered.

Two chapters also cover bonds on public improvements, both federal and state. A complete summary of state bond laws that provide protection to material suppliers, revised to include all 1951 changes is an important feature of this section. Credit problems met in export and import trade are discussed in another chapter.

Principles of Foundry Practice

FOUNDRY WORKS, by Edwin W. Doe; cloth, 109 pages, 6 x 9 inches, published by John Wiley & Sons Inc., New York, for $1.76; available from STEEL, Penton Bldg., Cleveland 13, O.

This book was prepared in co-operation with the Textbook Committees of the Educational Division of the American Foundrymen's Society. Its purpose is to teach the student simple principles of foundry practice. A brief early history of the industry is given. Then the fundamental foundry processes—molding, coremaking, melting, pouring, cleaning and finishing castings—are explained in a clear, concise manner. Tools and equipment required are discussed and illustrated.

The author then goes on to explain the various kinds of patterns, sand molding, baked sand cores, melting and pouring metals and alloys and cleaning and finishing castings. The final chapter deals with the occupational advantages in the foundry. Also included are a glossary of foundry terms, references and visual aids.

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ON REGULAR PROGRESSIVE DIE PRESSES
..but
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4-Slide
THESE FIGURES TELL THE STORY:
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TRIPLES PRODUCTION
LOWERS COST
Nilson Four-slides are built in many models to provide the most efficient production of formed parts of varying sizes made from coiled ribbon stock up to 2½", or coiled wire up to ½" in standard models.
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The chart shown above clearly demonstrates the big savings in overhead, maintenance, labor and time.
Figure it out! Taking the stock directly from the coil, Nilson combination press and 4-slide forming machines feed, straighten, pierce, blank, swage, stamp, coin, perform up to five forming operations and cut-off . . . all in one quick and precise operation! See how Nilson can save you money — boost production and profits on your wire or ribbon-metal forming operations. Get the facts today. Ask for bulletin.
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Developments in Electroplating

ELECTRO-PLATING, A SURVEY OF MODERN PRACTICE, by Samuel Field and A. Dudley Weill; cloth, 589 pages, 5 x 7½ inches; published by Pitman Publishing Corp., New York, for $6.00; available from STEEL, Penton Bldg., Cleveland 13, O.

This sixth edition explains and illustrates the newest methods in the electroplating industry, principles underlying modern processes and plant and apparatus used in every branch of the work.

Fundamental principles of chemistry and metallurgy, electricity and electrochemistry are covered in the beginning chapters of the book. Materials used in electroplating, sources of current, properties of electrodepositing solutions are then discussed. Other chapters deal with deposition of copper, silver, gold, nickel, zinc, cadmium, chromium and various metals. Final chapters cover testing of electrodeposits, allied processes and metal coloring.

The well-illustrated book is concluded with an appendix of useful information and a name and subject index.

Story of Antitrust Laws

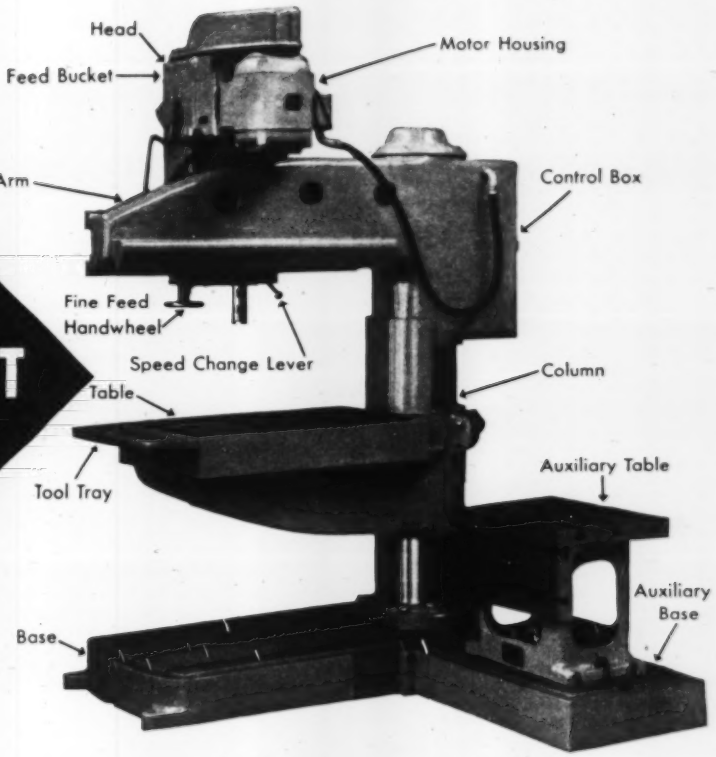
TEN THOUSAND COMMANDMENTS, by Harold Fleming; cloth, 206 pages, 5½ x 8 inches; published by Prentice-Hall Inc., New York, for $2.25; available from STEEL, Penton Bldg., Cleveland 13, O.

Written in laymen's language, this book tells the story of antitrust laws. It tells how the Supreme Court finds meanings in laws that are not intended by Congress and how the Court then rewrites these laws. The book explains how the various interpretations of the laws affect business and the consumer. Typical cases are cited.

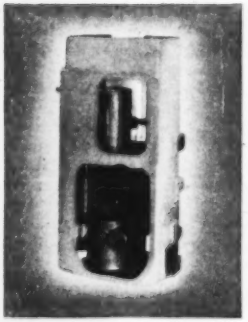
The book goes on to explain how the government has tried to break up large corporations and the ef-

THERE'S ONLY

ONE RIGHT WAY...



specify GRAY IRON castings!



This head casting is typical of the intricately shaped, rigid members that give the perfect life-long alignment essential in machine tool operation.

20 PARTS OF THIS RADIAL DRILL ARE GRAY IRON CASTINGS (13 are visible in this photo) because by using gray iron this manufacturer has achieved rigid, durable construction obtainable with no other metal.

WHETHER A PART OR ASSEMBLY is plain or intricate—if it calls for vibration absorption, strength and wear resistance at low cost—you can't afford to overlook the advantages of gray iron castings. Gray iron offers an unmatched combination of characteristics to meet today's design problems.

GRAY IRON CHARACTERISTICS INCLUDE: Castability • Rigidity • Low Notch Sensitivity • Wear Resistance • Heat Resistance • Corrosion Resistance • Durability • Vibration Absorption • Machinability • Wide Strength Range.

Make it better with Gray Iron

SCRAP IS NEEDED FOR DEFENSE—KEEP IT MOVING!

GRAY IRON FOUNDERS' SOCIETY, INC.

NATIONAL CITY-E. 6th BLDG., CLEVELAND 14, OHIO

How to insure
Power Driven Equipment

Agitators or blowers, conveyors or elevators, printing presses or pumps — it's all the same no matter what you make. When power transmission fails, your whole machine or equipment gets blamed. It's *your* reputation as the primary equipment builder that suffers the loss.

As a safeguard, increasing numbers of design engineers are specifying Winsmith Speed Reducers. They know by reputation and experience that Winsmith can be depended upon . . . that each of their machines so equipped leaves their plant with power transmission unexcelled. They know also, that the Winsmith nameplate is a positive selling point — a mark of merit that has industry-wide recognition for top quality engineering and fabrication.

In selecting a speed reducer within the 1/100 to 85 h.p. range for *your* machines or equipment, profit from the experience of others. Select the one that is on the approved list of the world's most highly regarded companies — Winsmith.

For all the facts, request "Save Through Standardization" Folder.

WINSMITH SPEED REDUCERS

WINSMITH, Inc.
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Springville (Erie County), N.Y.

fects this would have on American economy. In conclusion the author tells why the public does not understand what is going on. He also sees the situation jeopardizing the national defense.

Surveys Steel in Industry

STEELS IN MODERN INDUSTRY, W. E. Benbow, general editor; cloth, 562 pages, 8¾ x 5½ inches, published for Iron and Steel by Iliffe & Sons Ltd., London, England, available from British Book Centre Inc., New York, for $9.00.

This comprehensive survey by 29 specialist contributors, with Mr. Benbow, editor of *Iron and Steel* as general editor, was prepared to help engineers make the utmost use of such steels that are available.

Following an introductory section devoted as briefly as possible to the basic metallurgy of steel, there are 25 sections written by the contributors. Each section presents concisely what the engineer needs to know about properties of steels, their treatment and their applications in various branches of engineering. These sections, including the introduction, are grouped into four parts. Following the introduction, heads are general properties influencing engineering design, specific user aspects and surface treatments.

Petroleum Products Standards

ASTM STANDARDS ON PETROLEUM PRODUCTS AND LUBRICANTS; 784 pages, 6 x 9 inches; published by American Society for Testing Materials, Philadelphia; for $5.75, paper cover; $6.40, cloth cover, available from STEEL, Penton Bldg., Cleveland 13, O.

Groups of widely used standards in this 1951 compilation made by committee D-2, covers these broad classifications of petroleum products: Crude petroleum, butadiene, motor and aviation fuels, petroleum solvents and naphthas, diesel fuels, distillate burner fuels, kerosene and illuminating oils, lubricating oils, turbine oils, electrical insulating oils, plant spray oils, petroleum sulphonates, greases, petrolatums and paraffin waxes.

This edition gives in their latest form 129 of the society's standards. New material includes tentative test methods for total inhibitor content of butadiene, bromine number of petroleum distillates, reduced pressure distillation of petroleum products and hydrocarbon waxes used for electrical insulation.

Appendices include, in addition to report of committee D-2 on petroleum products and lubricants, proposed methods of test for penetration of lubricating greases worked more than 60 strokes and similar data.

The high-speed cleaning of the Wheelabrator makes minutes do the work of hours to effect big savings for Fairfield.

A Wheelabrator Table replaced an airblast table at the Fairfield Manufacturing Company and now cleans the same quantity of work in 1/3rd the time. The airblast machine had been operated around the clock without being able to keep pace with production schedules. The Wheelabrator eliminated this production bottleneck by its high-speed removal of heat treat scale from the multitude of sizes and shapes of gears produced.

The Wheelabrator Table is equipped with special features enabling Fairfield either to clean or to shot peen, according to customers' specifications, for increased fatigue life. A Wheelabrator Tumblast is also utilized for low-cost, high-speed removal of scale from forgings prior to machining.

Wheelabrator airless blast equipment is a big asset for any manufacturer. Its high-speed performance saves time and man-hours and cuts costs. Full particulars will be furnished without obligation. Write today for the complete story.

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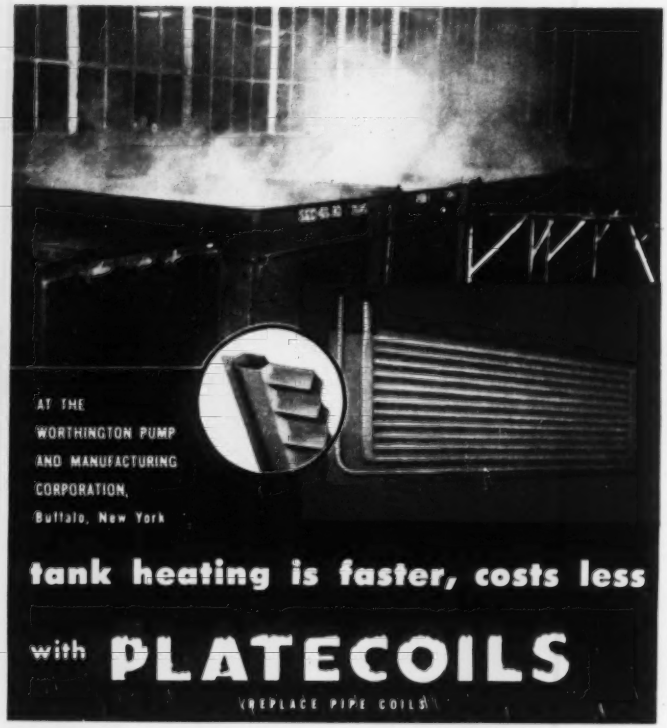
WHEELABRATOR & EQUIPMENT CORP.
509 S. Byrkit St. Mishawaka 5, Indiana

Wheelabrator
AIRLESS BLAST CLEANING

WORLD'S LARGEST BUILDERS OF AIRLESS BLAST CLEANING EQUIPMENT



Worthington Pump and Manufacturing Corporation has found that it costs less to buy and use Platecoils in their Parkerizing tanks than it does to make their own steel pipe coils. When the steel pipe coils were used, they had to be replaced on the average of every 3 months. The Platecoils have been in use over a year, and there have been no repairs or expenses other than the original installation cost.

Platecoils heat the tanks faster because they have greater prime surface in any given area. A 22" x 47" Platecoil gives the same heat transfer surface as 32 ft. of 1½" pipe. This not only means quick starts in heating tank solutions but also greater tank capacity for work.

"quick change hangers" make installation easy

By the use of "quick change hangers," Platecoil installations can be made in open tanks in a half hour or less by one man and a helper. There is no welding or pipe cutting . . . two connections to make and the installation is complete. Should repairs become necessary, Platecoils can be removed and replaced in a matter of minutes without emptying the tank. Replacement is made from outside the tank.

Let us show you how you can conserve steel and save time, money and manpower by using Platecoils for tank heating or cooling. Write today for bulletin No. P72.

PLATECOIL

KOLD-HOLD MFG. CO.
LANSING 4, MICHIGAN

CALENDAR
OF MEETINGS

† Denotes first listing in this column.

February 7-8, Instrument Society of America, New York Section: Power plant symposium, Hotel Statler, New York. Society address: 551 Fifth Ave., New York 17. Secretary: Richard Rimbach.

February 11-15, National Sand & Gravel Association: Biennial meeting, Hotel Conrad Hilton, Chicago. Association address: 1325 E. St. NW, Washington 4. Executive secretary: Vincent P. Ahearn.

February 12, Chamber of Commerce of the United States: National conference on labor relations, Pittsburgh. Chamber address: 1615 H St. NW, Washington 6. Executive vice president: Arch N. Booth.

February 14-15, Foundry Educational Foundation: Technical and university advisory committees conference, Hotel Statler, Cleveland. Foundation address: Terminal Tower, Cleveland 13.

February 15, Eastern States Blast Furnace & Coke Oven Association: Annual winter meeting, Hotel William Penn, Pittsburgh. Secretary: Benjamin B. Frost, Arthur G. McKee & Co., Cleveland.

February 16-21, Automotive Electric Association: Annual meeting, Edgewater Beach Hotel, Chicago. Association address: 800 Michigan Bldg., Detroit 26. Secretary: S. W. Potter.

February 18-19, National Association of Aluminum Distributors: First annual meeting, Hotel Drake, Chicago. Association address: 905 Midland Bldg., Cleveland 13. Executive secretary: Raymond L. Collier.

February 18-20, National Crushed Stone Association: Annual meeting, Hotel Conrad Hilton, Chicago. Association address: 1415 Elliot Place NW, Washington 7. Administrative director: J. R. Boyd.

February 18-20, American Management Association: Personnel conference, Palmer House, Chicago. Association address: 33 W. 42nd St., New York.

February 18-21, American Institute of Mining & Metallurgical Engineers: Annual meeting, Hotel Statler, New York. Institute address: 29 W. 39th St., New York. Secretary: Edward H. Robie.

February 21-22, Society of the Plastics Industry (of Canada) Ltd.: Annual conference, Royal York Hotel, Toronto. Society address: 67 W. 44th St., New York 18. Executive vice president: William T. Cruse.

February 25-26, Materials Handling Conference: Purdue University, sponsor. Address: W. Lafayette, Ind.

February 25-28, Industrial Ventilation Conference: School of Engineering, Michigan State College, E. Lansing, Mich. Secretary: K. E. Robinson, Division of Industrial Health, Michigan Dept. of Health, Lansing, Mich.

February 28, Bituminous Coal Research Inc.: Annual meeting and exhibit, Edgewater Beach Hotel, Chicago. Address: 804 Southern Bldg., Washington 5. Secretary: C. A. Reed.

March 3-7, American Society for Testing Materials: Spring meeting & committee week, Hotel Statler, Cleveland. Society address: 1916 Race St., Philadelphia. Secretary: C. L. Warwick.

†March 4-6, Society of Automotive Engineers: National passenger car, body and materials meeting, Hotel Book Cadillac, Detroit. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

†March 10-14, National Electrical Manufacturers Association: Annual meeting, Edgewater Beach Hotel, Chicago. Association address: 155 E. 44th St., New York 17. Managing director: W. J. Donald.

†March 10-14, National Association of Corrosion Engineers: Annual conference and exhibit, Hotels Buccaneer and Galvez and Galveston Municipal Pier, Galveston, Tex. Association address: 919 Milam Bldg., Houston 2. Secretary: A. B. Campbell.

†March 17-21, American Society of Tool Engineers: Annual meeting and biennial industrial exposition, International Amphitheater, Chicago. Society address: 10700 Puritan Ave., Detroit. Secretary: Harry Conrad.

Tandem bearings made

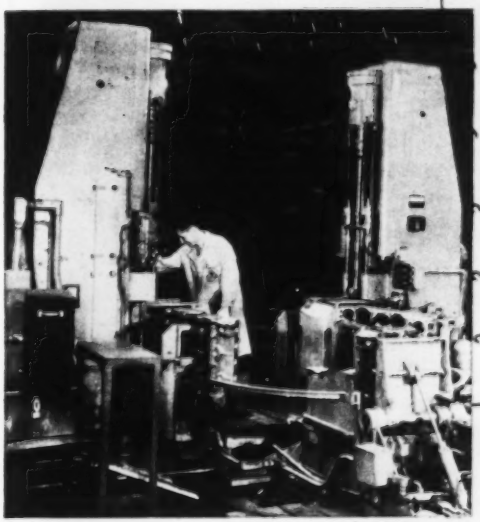
ROUND ★ STRAIGHT ★ IN LINE

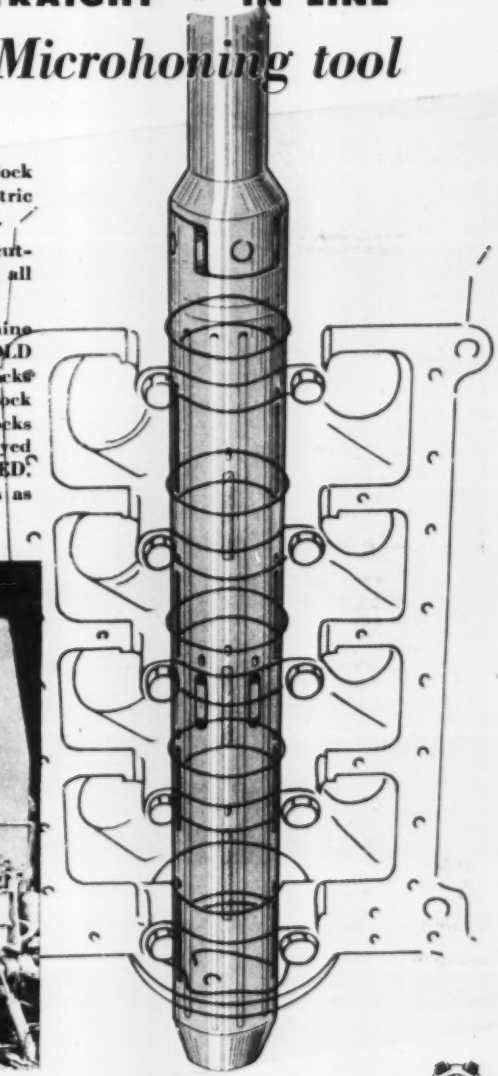
with NEW *Microhoning tool*

ALL FIVE bearings in V-8 cylinder block MICROHONED within .0005" for diametric size, roundness, straightness and alignment.

Plastic guides stabilize tool and control cutting. One bank of abrasives MICROHONE all bores.

This double column Model 740 machine equipped with new guided type MICROMOLD tools MICROHONES Main Bearings in 60 blocks per hour, removing approximately .002" stock from the diameter of each bearing. The blocks are automatically taken from the line, conveyed to either of the columns, and MICROHONED. The operator makes occasional spot checks as the blocks leave the machine.





Write for Cross Hatch for complete story on MICROHONING Interrupted Surfaces.

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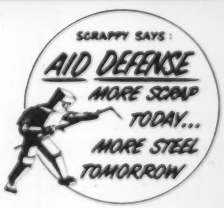
District Field Offices: 1323 S. Santa Fe Avenue, Los Angeles 21, California • 204 S. Main Street, Rockford, Illinois • 231 S. Pendleton Avenue, Pendleton, Indiana • MICRO-MOLD Manufacturing Division, Boston Post Road, Guilford, Connecticut • 55 George Street, Brantford, Ontario, Canada

Let us try to help you! Very frequently our experience will suggest a way out of your particular steel supply difficulty. We may have substitute materials or know of ways to stretch the supply of steel available to you. Call us *first* when you have a steel problem.



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UNITED STATES STEEL

Scarifier Cleans Trucking Aisles

USE REPLY CARD—CIRCLE No. 1

Scarifying machine that cuts loose and picks up hard embedded layers of debris from large trucking aisles is introduced by G. H. Tennant Co., 2598 N. Second St., Minneapolis 11, Minn. Driven by

. . . shears 36-inch wide path at 1 to 11 mph

a 25 hp, air-cooled engine, the scarifying cylinder hurls loosened grime into the built-in, 10-cu ft dirt hopper. At the same time, a vacuum fan pulls lighter dirt and dust into a heavy fabric bag. Cylinder rotates at 1400 rpm and shears a 36-inch wide path.

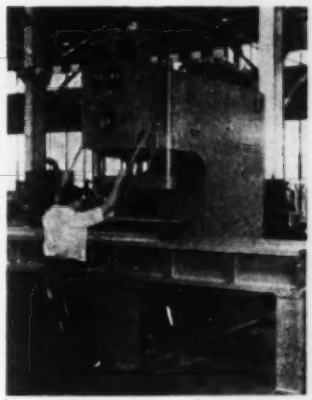
Operator can lift and dump the lever-controlled hydraulic hopper, with an average load of 530 pounds, in 18 seconds. Hopper is raised to a 35-inch clearance, then dumped directly into a tote or trash box without extra handling. Two types of cylinders are used. For heavy soilage, such as packed layers of dirt and grease, a steel wire brush is sufficient. For more solid material, such as metal chips or tar and cement splashes, a Revo-tool cylinder is used for pulverizing. Hydraulic operation controls the bite of both cylinders into grime.

Press Capacity Is 75 Tons

USE REPLY CARD—CIRCLE No. 2

C-frame hydraulic press, built by Elmes Engineering Division, American Steel Foundries, 1150 Tennessee Ave., Cincinnati 29, O., is specially equipped for multi-duty operation. For ordnance production, a long table (see cut) is provided for use in straightening gun barrels. Table is removable, making the press available for general-purpose straightening. In addition an opening in the bed permits its use for forcing operations.

To enhance operator's safety, the dual hand lever is interlocked with foot treadle. Ram will not descend until both hand levers and foot treadle are depressed. Unit



. . . equipped for multi-purpose operation

is added to the company's line of straightening presses that range from 25 to 500 tons and forcing presses from 25 to 800 tons capacity.

Cold Test Bath Redesigned

USE REPLY CARD—CIRCLE No. 3

Redesign of its Frigistat bath to provide efficient frost-free operation with a minimum of temperature control adjustment is announced by Precision Scientific Co., 3737 W. Cortland St., Chicago 47, Ill. The manually operated bath is designed to follow ASTM method D97, and can be maintained within plus or minus 2° F.

Its seven-unit test chamber and dry ice chamber are insulated with 2½ inches of glass wool at sides and bottom. Cooling medium is circulated in test chamber through coils that prevent interchange of fluid between chambers. The unit's ¼-hp pump and a full charge of dry ice are sufficient to reduce temperature in the test chamber to −90° in one-half hour. Housing is steel, with heavy Bakelite top. Inner chambers are spun copper; all pipes and fittings are brass. Unit is 24½ inches wide, 13 inches deep and 18 inches high.

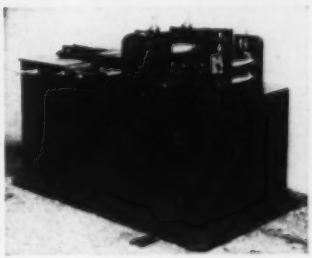
REPLY CARDS

on page 177 will bring you more information on any new products and equipment in this section.

Machine Edges Strip Steel

USE REPLY CARD—CIRCLE No. 4

Burrs and chamfer on the edges of sheared or slit strip steel are removed by an edging machine developed by Middleton Steel Corp., Brooklyn 20, N. Y. and Merry Co., River Rouge, Mich., and marketed

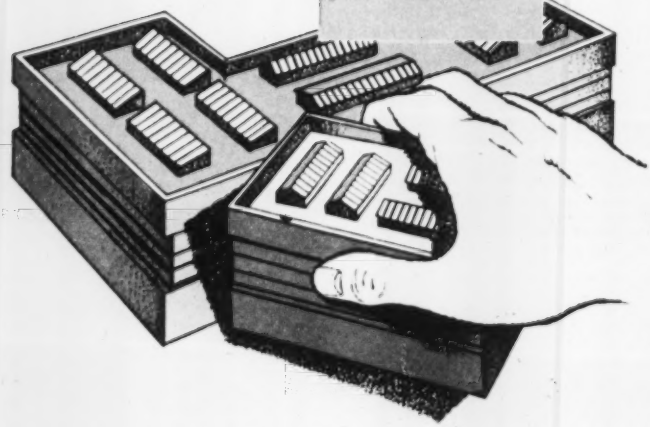


. . . adapted particularly to warehouse use

by the latter. The unit is particularly adapted to warehouse service. Machine is equipped with interchangeable roll-type die blocks machined with different recesses depending upon the type of edge desired in the finished strip. Sheared stock enters the edger between the front hold-down guides, which tend to level it and remove any camber.

The piece then passes between a set of two-high rotary die blocks where it is frictionally engaged and moved forward. Annual recesses machined on the face of the rotary dies impart a straight radius on both edges of the piece and

New Wing for Your Plant... Now!



Without overhead expense or costly delay you can add a modern, well-equipped, manufacturing department to your plant. It has presses of 40 to 450 ton capacity and its staff has 37 years experience in the engineering and manufacture of medium and heavy stampings.

If your production involves stampings, find out now how Geometric can do the job for you inexpensively, to specifications and *on time*. You'll be time and money ahead!

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GEOMETRIC STAMPING CO.

A Subsidiary of Barium Steel Corp.

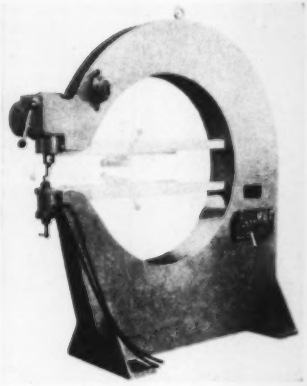
1130 E. 200th Street Cleveland 17, Ohio

eliminate any burrs caused by the shearing or slitting operations. Stock leaving the roll dies passes between the rear holddown blocks or dies, which keep it straight and remove any camber that remains. It then enters the gap of a pair of idler finishing rotary die blocks which roll out any irregularities left by the edging operation.

Cutter Trims Bulky Stampings

USE REPLY CARD—CIRCLE No. 5

Metal cutting machine for use by industries making large and bulky stampings is introduced by American Pullmax Co., 2455 N. Sheffield Ave., Chicago 14, Ill. To insert bulky work, the lower tool holder is raised and lowered by pneumatic pressure. Trimmer does all the work of straight, circle and irregular cutting that the company's standard unit can do. Box construction frame is circular to provide clearance for large pieces and bars that hold circle and straight cutting attachments are movable.



. . . circular box frame provides clearance

Machine works mild steel to 5/32-inch, from 4 to 16 fpm. It has throat depth clearance of 48 inches and is powered by a 1 hp motor. Mechanism is totally enclosed and operates in oil.

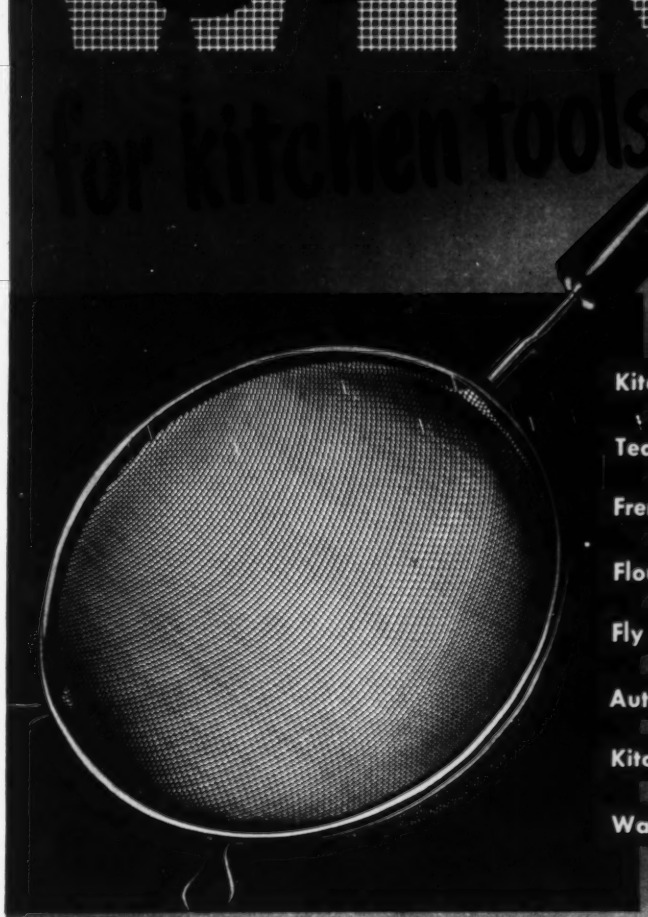
Rack Adapted to Die Storage

USE REPLY CARD—CIRCLE No. 6

Standard tubular pallet rack developed by Borroughs Manufacturing Division, American Metal Products Co., 5959 Linsdale, Detroit 4, Mich., is adapted especially for storage of dies. Steel deck is

WIRE

for kitchen tools



Kitchen Strainers

Tea Strainers

French Fry Baskets

Flour Sifters

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Automatic Dishwasher Baskets

Kitchen Range Air Filters

Water Faucet Filters

If you use wire cloth—whether it's for dishwashers or diesels . . . automobiles or aircraft . . . flour sifters or floor furnaces . . . french fryers or farm tractors—1-inch to 120-mesh—consult Reynolds Engineers.

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for Production, Maintenance, Construction

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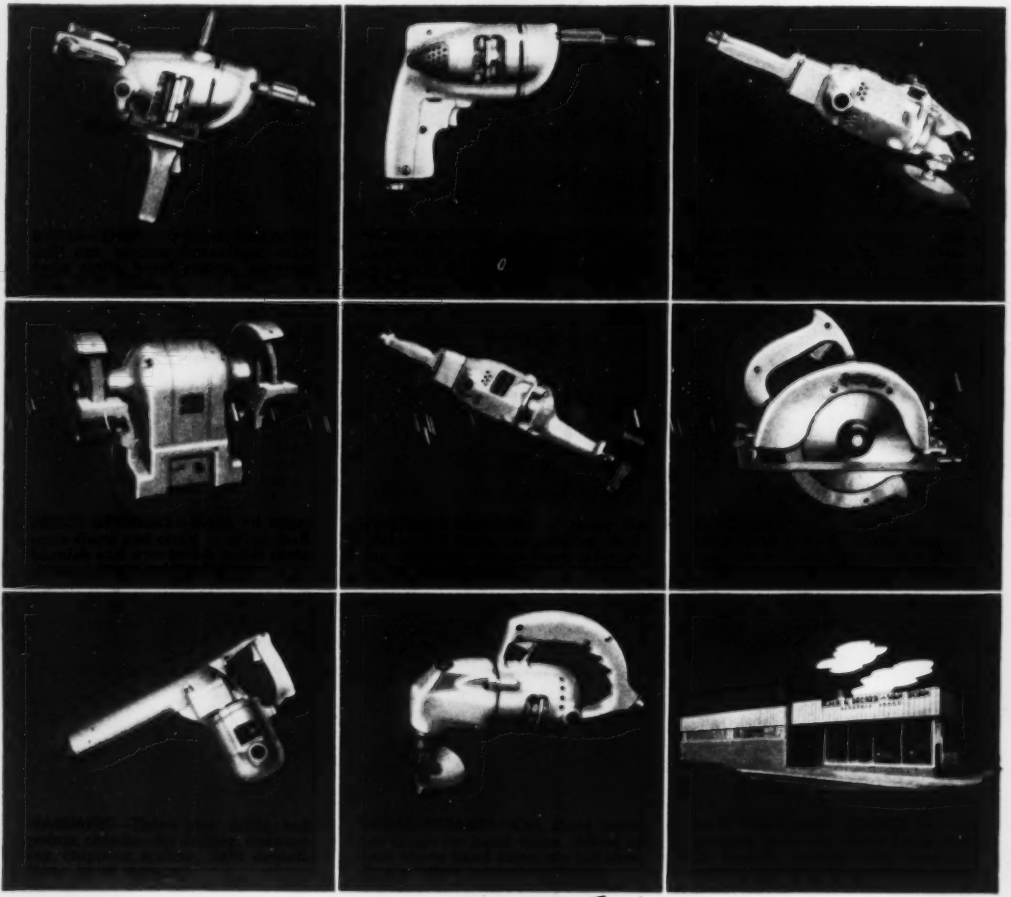

You name the job and there's a Black & Decker Tool to help you do it better, faster, with fewer man-hours, at lower cost! Check the Tools shown on this page—just a sample of more than 100 in the world's most complete line. Then see your nearby Black & Decker Distributor for eye-opening demonstrations—for full details on their easy handling, abundant power, quality construction—for sound advice on any tooling problem. Learn why it pays to "Switch to Black & Decker POWER!"

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WRITE TODAY for new 1952 B&D Catalog. Gives full details on complete line of tools and accessories. Yours free for the asking! THE BLACK & DECKER MFG. CO., 620 Pennsylvania Ave., Towson 4, Maryland.

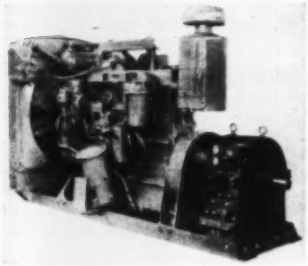
B&D

placed on units of rack bed with flanges turned down on each side to avoid raw edges. Assembly is simplified because no bolting or welding in joining beds and uprights is necessary. Disassembly is equally convenient because it is done without need for cutting. Racks can be tiered to any height needed. A wide variety of deck material is available including sheet steel, plywood and board.

Single-Stage Torque Converter

USE REPLY CARD—CIRCLE No. 7

Single-stage three-element type torque converter, the model 17-K, is added to the standard converter line made by Torcon Corp., 1188 W. Fifth St., Ashtabula, O. Model can be used with gas or diesel engines rated to 300 hp. Hydraulic converter and coupling are combined in a single unit, roller bearing equipped to gain maximum life. Converter's variable torque ratio reaches 3:1.



. . . has variable torque ratio up to 3:1

Major elements are converter pump, turbine and reaction member. For continuous operating efficiency and servicing simplicity, there are no close tolerances in these elements. Each is a single-piece aluminum casting. Bearings were designed so sprocket or gear drive can be attached to output shaft without an outboard bearing. The chain-driven oil circulating pump is mounted on a base plate to ease inspection.

Ventilator Clears Impure Air

USE REPLY CARD—CIRCLE No. 8

Air contaminated with smoke, fumes, dust and heat is cleared rapidly from specific areas by the free exhaust industrial fan ventilator made by Burt Mfg. Co., Dept. S, 927 S. High St., Akron 11, O. Ventilator is powered by the company's axial flow fan, connected directly to its motor. Air shaft extends above the fan, terminating in a pair of dampers that open and close automatically as the fan is turned on and off. Free damper opening allows an unrestricted volume of air to be driven vertically upward at high velocity by the axial flow fan.

Seven ventilator sizes, with motors from 1/3 to 5 hp, provide capacities from 5000 to 75,550 cfm. Galvanized sheet is used in standard construction; use of other metals can be specified.

Unit Positions Hopper Cars

USE REPLY CARD—CIRCLE No. 9

Welding positioner that automatically engages, raises and rotates a 70-ton hopper car is a development of Pandjiris Weldment Co., 5151 Northrup Ave., St. Louis, Mo. Cars are clamped automatically by air cylinders that operate

Cuyahoga Turns-up New Ideas Everyday!

IF YOUR PRODUCT requires a special spring, wire part or stamping . . . made from either round or flat steel . . . it will pay you to check first with Cuyahoga . . . because, designing and creating the unusual is an everyday occurence with Cuyahoga's skilled engineers and wire part craftsmen.

They have solved thousands of problems for leading manufacturers in the automotive, aircraft, electrical, ordnance, appliance and many other industries . . . perhaps they can help you.

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The CUYAHOGA SPRING Co.

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TO GET YOUR NEW PRODUCTION GOING AND KEEP IT GOING

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INQUIRIES PROMPTLY ANSWERED

the outriggers on the positioner. Raising and rotating are accomplished by pushbuttons that synchronize the movement. Entire operation is completed in less than three minutes. No track damage occurs, since the car is raised clear before rotation begins.

Positioner affords complete accessibility and eliminates obstructions to the welding process. Production rate attributed to use of the positioner is about 300 feet of welding done in 17 minutes by 10 manual welders and 12 semi-automatic submerged-arc welders.

Automatic Packaging Machines

USE REPLY CARD—CIRCLE No. 10

Two packaging machines made for automatic volume bundling and tape reinforcing are offered by Guide Co., Canfield, O. The first unit, model G.W., handles bundles 4-20 inches in both height and width and a minimum six inches long. It applies one or two complete wraps of pressure-sensitive filament tape around cartons, bundles of cartons or similar items at a rate of five wraps per minute.

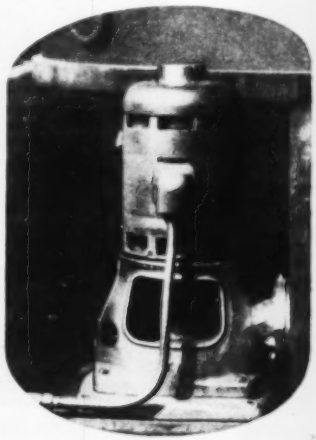
The second model, called C.G., is used with wide conveyor tracks or inclined tables. Designed for mass production bundling, it automatically loads, applies tape and unloads a bundle every 20 seconds at maximum speed. The model features a center section that receives, nests and clamps items to be bundled. Its two adjustable tape-applying heads are at either end of the center section.

Pump Moves Difficult Materials

USE REPLY CARD—CIRCLE No. 11

Pump that transfers corrosive, abrasive or similar products previously considered difficult to handle, is a development of Manton-Gaulin Mfg. Co., Everett 49, Mass. Action is done by two fluid pistons: High pressure pump transfers hydraulic fluid alternately to and from cylinders; four way hydraulic valve, actuated by a solenoid, controls the fluid direction. Cylinders are made of stainless steel or other materials when required.

Designated the Hydrex, the unit handles slurries, extremely viscous pastes, abrasive or corrosive fluids and suspended solids without being



FOR THE YEARS TO COME

When a big Petroleum Refinery and a major Pipeline Corporation needed a thoroughly dependable supply of low cost water they promptly ordered the installation of Layne wells and pumps. Their selection was based upon the proven efficiency, ruggedness of construction and the extra years of good service they could expect from Layne well water supply units. Very wisely they invested for the future.

Thousands of Layne well and pump installations ranging from one to twenty-five or more units, are giving outstanding service for cities, factories, railroads, dairies, chemical plants, packing houses, hotels, pipelines, refineries, air fields, army camps and naval stations. All were designed, built and installed complete by Layne's own engineers and field crews.

Layne enjoys the distinction of being the world's most experienced well water developers. No other organization has so much to offer those who are in need of well water supply units. Whether the requirements are for thousands or millions of gallons of water daily, Layne is ready to serve you. For further information address

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General Offices, Memphis 8, Tenn.

Layne offers a wide range of fully illustrated catalogs covering all phases of well water installations for all types of industry. Write for more information to

Layne WATER SUPPLY WELLS & PUMPS

Tough little jobs become easy with

BEHR-MANNING *Special* Abrasive Tools

MUSHROOM* SANDING PADS AND DISCS
Shape and polish low areas as drawing-die work, deburr and polish edges, finish concave or flat surfaces.

METALITE® CLOTH SPIRAPOINTS®
Mounted on threaded mandrels, they produce high finishes in odd-shaped recesses or on various radii.

Want to deburr a hard-to-reach spot on a production job, polish an inside surface, round a corner, chamfer an edge, or what have you? Among these BEHR-MANNING Abrasive Tools you will find just the right trick to handle the operation in jig-time and safeguard your profits. These tools are all adaptations of the famous BEHR-MANNING METALITE® Cloth, but so formed as to work on a mandrel or expanding drum, in any chuck on a portable or stationary spindle. They're available in a wide range of sizes and grits.

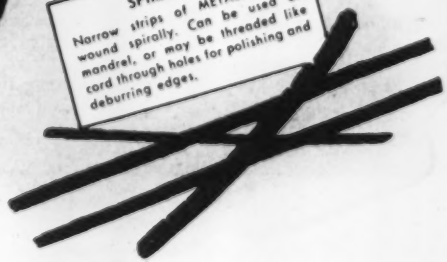
Look these tools over with your own production problems in mind. Make your own check-up, or better still let your local BEHR-MANNING Abrasives Engineer do it — write us.

The booklet "Blueprints for Production" gives various case histories that show you new ways to cut costs with BEHR-MANNING coated abrasives. Write for it — address Dept. S-2.

METALITE CLOTH PENCILS
Used on a mandrel for polishing channels, fillets, rounded corners, and the sidewalls and bottoms of "dead-end" holes.

METALITE CLOTH SLOTTED DISCS
When pushed into a hole, the slots enable the sections to overlap, polishing the hole surface. Fine for radiusing and deburring drilled openings.

SPIRABANDS®
For Deburring edges and finishing interior surfaces of drawn, sheared or stamped metal parts. Fit expanding rubber drums on portable tools.



SPIRACORDS®
Narrow strips of METALITE cloth wound spirally. Can be used on mandrel, or may be threaded like cord through holes for polishing and deburring edges.

®, *Trade marks.

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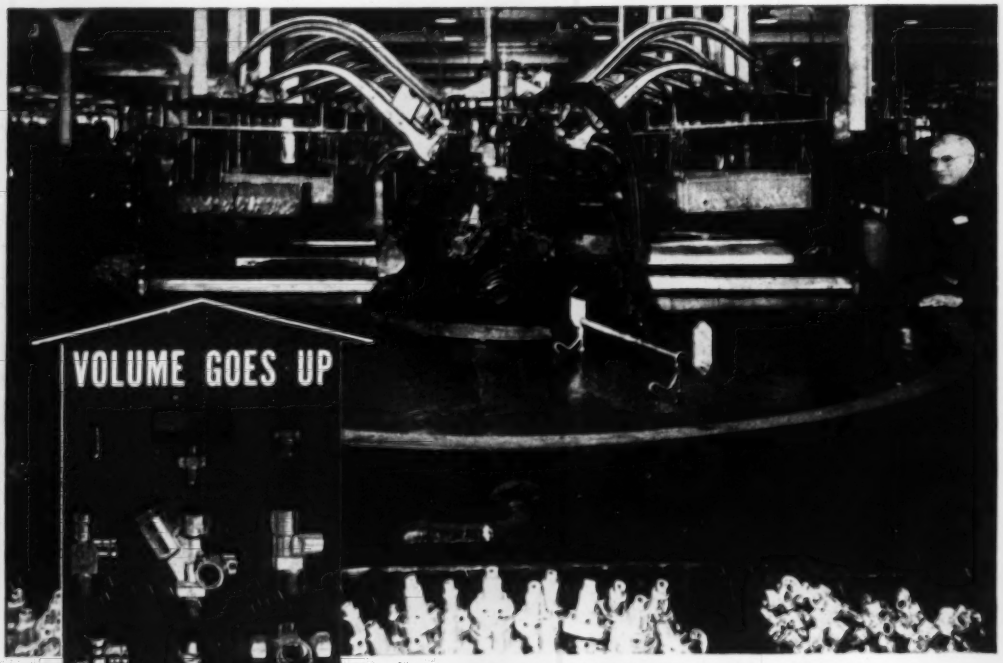


Stevens Full Automatic at Bastian Blessing's Chicago plant used for processing valve parts shown in inset.

When a Stevens Automatic Goes To Work . . .

Look at the results reported by The Bastian Blessing Company of Chicago, after installing a Stevens Special Full Automatic Bright Dipping Machine!

E. N. Krein, vice president, says: "Although our Stevens Machine has been in operation only three months, it has demonstrated its advantages in so many ways that *we wish to confirm the claims made by Stevens about this equipment!* Parts sent through this machine without prior cleaning come out *dependably and uniformly bright and free from grease, dirt and chips.* We have *increased our volume and reduced our unit costs* on our bright dipping operations. The installation is doing a big job in this day of labor shortages and it is doing it without the fumes and personal protective equipment of the past. Our records show that the workmen appear quite pleased and it looks like we will have less labor turnover in this work."

There you have the word of a satisfied customer —the best endorsement of all. Why don't you let your Stevens representative show you how Stevens equipment can bring new profit and economy to *your* operations? Call him today or write direct to *Frederic B. Stevens, Inc., Detroit 16, Michigan,* for complete information. There's no obligation.

METAL FINISHING EQUIPMENT AND SUPPLIES SINCE 1883

FREDERIC B. STEVENS INCORPORATED

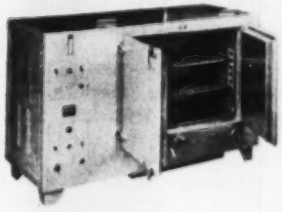
DETROIT 16, MICHIGAN

damaged. Where contact between pumping medium and the product must be avoided, a suitable membrane is provided. Cylinders have no bearings, mechanical pistons, packing glands, valves or impellers.

Mechanical Convection Oven

USE REPLY CARD—CIRCLE No. 12

Improved uniformity throughout and improved heat transfer between heater bank and load in the oven are features of the Con-Wate mechanical convection oven, developed by Blue M Electrical Co., 306-308 W. 96th St., Chicago 21, Ill. The oven provides constant air



. . . controls velocity to any desired value

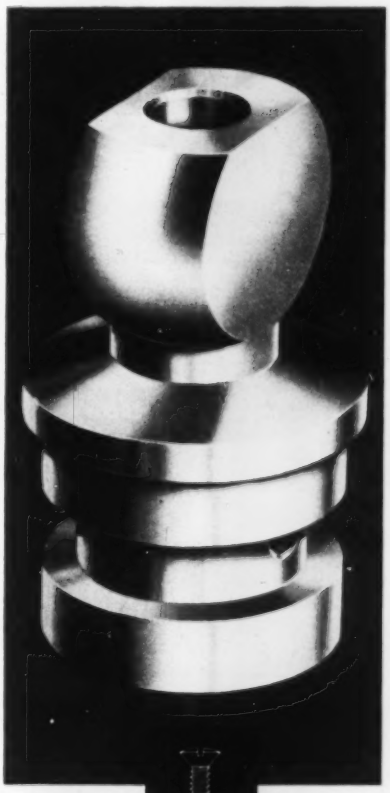
weight circulation at all temperatures by a quadrant setting that permits definite quantity control. This, in turn, controls velocity to any desired value from the equivalent of 50 to 250 fpm.

Condition of air circulation in the heated chamber is shown at all times by the company's Visi-Float. Double wall insulated stainless steel panel directly above the heater tank eliminates objectionable radiant heat. Three point suspension motor to blower direct-drive makes belts, pulleys and countershafting unnecessary.

Gear Reducer Cuts Motor Speed

USE REPLY CARD—CIRCLE No. 13

Gear reducer with internal fluid coupling, made by Reuland Electric Co., Alhambra, Calif., has the company's standard fluid-shaft motor and gear train designed into a single compact unit. Integral fluid coupling provides cushioned starting of heavy loads and protection against equipment jamming. Power-take-off shaft, gears and bearings are placed immediately adjacent to the vertical centerline of the strong pyramidal base. Thus, load pull is transmitted di-



Automatic Screw Machine Products

in steel, brass, or other metals . . . from 1/16" to 2¼" diameter are simple production runs at Blake & Johnson. Slotting, cross-drilling, burring, broaching, slabbing, roll-threading and drilling—are everyday operations. Our engineering and manufacturing know-how is at your service whether you need custom-built machine parts or slotted as well as Phillips head machine screws, tapping screws, stove bolts, Twin-Fast® wood screws, special headed products, machine screw nuts, rivets, chaplets, wire forms.

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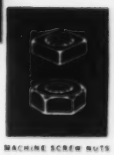

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fastenings

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NO. 1 PRECISION GEAR HOBBER
With built-in accuracy, and stamina beyond average requirements, the unique feature of independent selection of speed, feed, and indexing makes possible the delivery of a selected accuracy at higher speed, or a selected speed with greater accuracy than can be achieved by other machines. We are proving this daily. Complete information is offered in our free Bulletin No. H-491. Write for it now!
BULLETIN NO. H-491
THE Hamilton TOOL COMPANY
848 SO. NINTH STREET • HAMILTON • OHIO • U • S • A

rectly to the base, minimizing lateral stress.

All gears operate in an oil bath, assuring constant positive lubrication. Helical gears are hobbed from special alloy steels. Standard units are available with squirrel cage, fluid-shaft or slip ring driving motor, in either polyphase or single phase. Gear train can be single or double reduction and all types are available in drip-proof or totally enclosed designs. Output speeds range from 1 to 600 rpm.

Hydraulic Portable Crane

USE REPLY CARD—CIRCLE No. 14

Series TM hydraulic portable crane is an addition to the line of shop equipment made by Lempco Products Inc., Bedford, O. Crane is all-welded girder type with square members, operated by a hand pump. Hydraulic lifting mechanism is a single unit pump with variable speed. Unit includes no hose couplings, but has built-in check valve to prevent sudden lowering of a load. Available in 1 and 2-ton capacities, low and high mast styles are offered in the standard line. Another model has revolving base instead of legs for use on a truck or shipping platform or for shop use to handle heavy material. Optional accessories include an attachment for stacking or moving miscellaneous drums or crates and a telescoping boom extension.

Power Take-Off Installation

USE REPLY CARD—CIRCLE No. 15

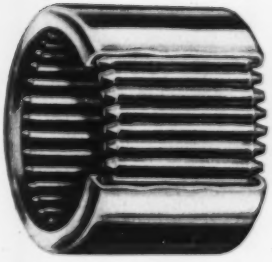
Power take-off that can be applied to trucks with standard transmission units is offered by Mobile Power Inc., 3020 E. Grand Blvd., Detroit 2, Mich. Called Tangen power drive, its use makes available 97 per cent of engine's power for auxiliary power purposes. Units can be removed easily from one transmission and installed in another.

Power is transmitted through the main drive gear in the transmission but installation in no way affects standard driving mechanism. Power is available whether the vehicle is in motion or stationary. By governor control, vehicle is operated at desired rate of speed while the rpm required for proper

no housing problem...

Torrington Needle Bearings need no elaborate, expensive housings. A straight bore—machined to proper dimensions—is all that's required. No positioning shoulders... no spacers... no retainers! Simple to install, Needle Bearings are seated by press fit. An arbor press operation does the job easily and quickly.

Reductions in the size—and weight—of housings and related parts are also possible because of the compactness of Needle Bearings. Stronger, more economical designs often result. Want more details? Then drop us a line, today.



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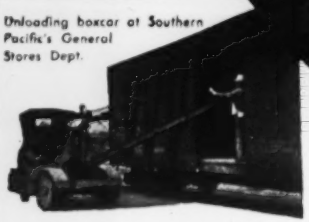
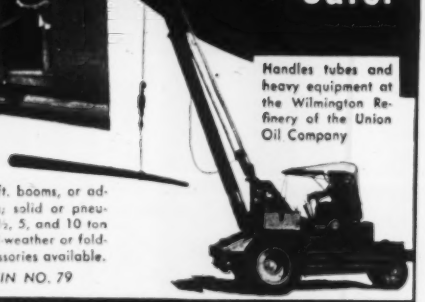
SWING-BOOM MOBILE CRANE
to Cut Costs by Handling Loads Easier, Faster, Safer

Stocking fittings at a Los Angeles Public Utility



Unloading boxcar at Southern Pacific's General Stores Dept.



Handles tubes and heavy equipment at the Wilmington Refinery of the Union Oil Company

Gas or diesel, 12 to 37 ft. booms, or adjustable telescopic booms; solid or pneumatic rubber tires. 1½, 2½, 5, and 10 ton cap. Buckets, magnets, all-weather or foldable tops, and other accessories available.

WRITE FOR BULLETIN NO. 79

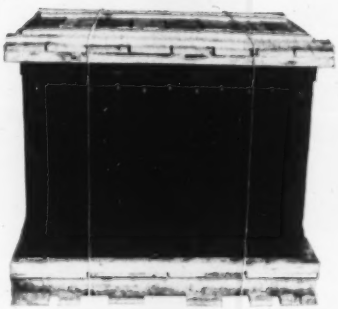
SILENT HOIST & CRANE CO. 849 63rd ST., BROOKLYN 20, N.Y.

U·S·S Gerrard Steel Strapping fits all your tying jobs better!

● Gerrard Round Steel Strapping is versatile enough for all types of packing, from light cartons to large crates, from circular packages to odd-shaped bundles and heavy pallets.

Gerrard Strapping complies fully with Army-Navy specifications JAN-P-106A, JAN-P-107, and JAN-P-108 for overseas packing. It assures a tight, secure tie to final destination.

Call a Gerrard engineer for further information about the grade of Gerrard Round Steel Strapping and the type of Gerrard machine that will best fit your specific tying needs.



Pallet reinforced with Gerrard Round Steel Strapping permits quick packing and easy handling of shell cases.

GERRARD STEEL STRAPPING DIVISION
UNITED STATES STEEL COMPANY
4745 S. Richmond St., Chicago 32, Ill.

U·S·S GERRARD ROUND STEEL STRAPPING

USS

UNITED STATES STEEL

power output is maintained. Need for separate auxiliary engine for power application is eliminated.

Cold Spray Bonding Solution

USE REPLY CARD—CIRCLE No. 16

Phospray, a cold spray bonding solution developed by Du-Lite Chemical Corp., Middletown, Conn., eliminates preparatory steps such as cleaning, rinsing, drying, etc. It dries immediately and the product is ready for final finish application. The solution may be used on all metal except aluminum.

Rotating Type Limit Switch

USE REPLY CARD—CIRCLE No. 17

A rotating type limit switch for application where reversing operation is to be co-ordinated with the number of revolutions of a motor shaft or driven equipment is announced by General Electric Co.'s Control Department, Schenectady, N. Y. It can be adjusted to operate from four to 110 turns of the driving shaft with five turns overtravel in either direction.

Industrial Dust Pan

USE REPLY CARD—CIRCLE No. 18

Palmer-Shile Co., Detroit 27, Mich., offers a metal dust pan on wheels. It measures 18 x 18 x 18 inches and is made of 16-gage sheet steel. Frame is of 1 x 1½ x ⅛-inch angle iron with handle of 1-inch tubing. It has two 8-inch rubber-tired, ball bearing wheels.

Panel Vent Sets

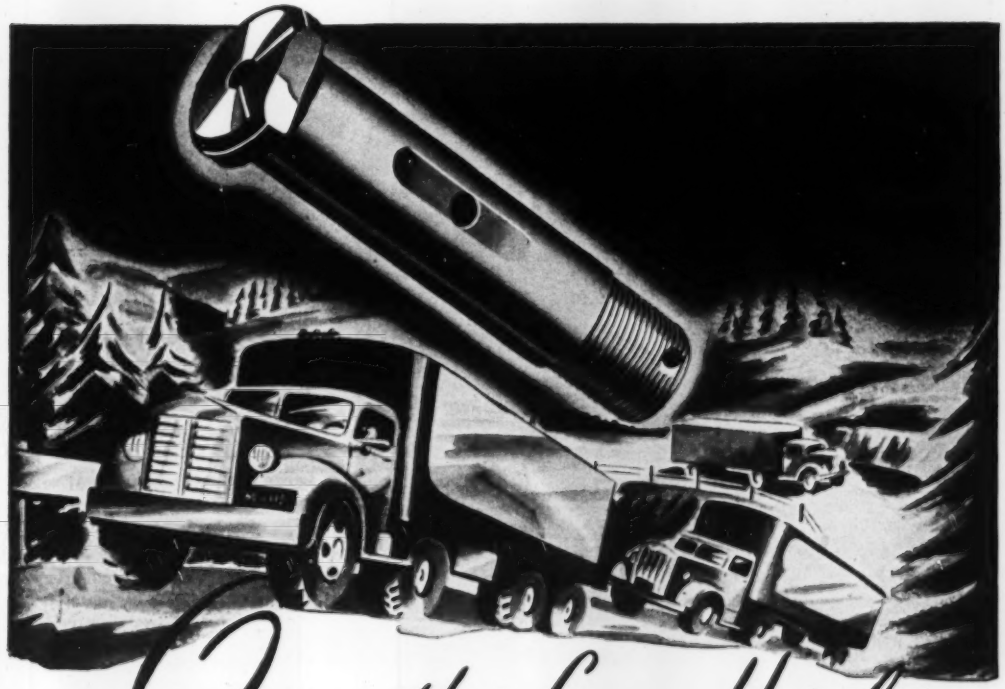
USE REPLY CARD—CIRCLE No. 19

DeBothezat Fans Division, American Machine & Metals Inc., E. Moline, Ill., offers a panel vent set for use at free delivery or relatively low static pressure. The units are available with fan wheels 24, 30 and 36 inches in diameter with air-moving capacities up to 13,190 cfm.

Prevents Plug Disconnections

USE REPLY CARD—CIRCLE No. 20

A heavy duty electric plug with a positive locking device is offered by Hopax Electric Inc., New York 13, N. Y. Known as Lock-Plug, it fits any standard twin receptacle. A heavy metal adaptor plate with locking slots fits directly over



Over the Long Haul

The FERRY CAP Spring Bolt *Proves its Mettle*

This Ferry Cap Spring Bolt is one of hundreds of different designs which we make for leading truck manufacturers. We manufacture them to various head shapes, with oil holes and grooves of different kinds, and flats accurately milled. Precision is a principle at Ferry Cap.

The bolt has maximum ground surface-wearing qualities. It is case hardened to proper depth, achieving a hard surface with a relatively soft core, assuring both long wear and high fatigue strength. The thread end is annealed to make it tough, but not brittle—more than equal to the required thread strength.

The body is ground to close tolerance, oil holes expertly drilled, and flats milled to a smooth, true surface to allow free flow of lubricants. The cotter holes, accurately drilled, are free from burrs. Result—the bolt fits perfectly.

It is a spring bolt of which any truck manufacturer can well be proud—a clean cut, precision-made, long-wearing, tough, dependable product.

The FERRY CAP & SET SCREW Co.

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CAP AND SET SCREWS • CONNECTING ROD BOLTS • MAIN BEARING BOLTS • SPRING BOLTS AND SHACKLE BOLTS • HARDENED AND GROUND BOLTS • SPECIAL ALLOY STEEL SCREWS • VALVE TAPPET ADJUSTING SCREWS • AIRCRAFT ENGINE STUDS • ALLOY STEEL AND COMMERCIAL STUDS • FERRY PATENTED ACORN NUTS

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...simplest mass handling method known!

Now... you can move 45,000-pound payloads of billets, bars, plate, in-process and finished steel *where* you want them *when* you want them... at a moment's notice!

Now... you can be free of the restrictions of a plant railroad handling system... its expensive trackage, cars, locomotives... costly, time-consuming switching operations!

Now... you can prevent congestion in the mill... free more mill space for production operations..., eliminate costly re-handling ... save time and money in getting out current orders!

How? With Ross Series 100... the *only* Carriers designed and built all the way through for rough, tough steel mill service... the *only* Carriers with that great reserve strength steel men demand. Self-loading and unloading, Ross Series 100 requires only a driver... and moves capacity loads at speeds up to 33 mph.

Don't overlook the outstanding advantages of the Ross Carrier Steel Handling Method... ASK STEEL MEN WHO *KNOW*! Get full details on Ross Series 100 Carrier... a 'phone call, wire or letter will do it.

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THE ROSS CARRIER COMPANY
Direct Factory Branches and Distributors Throughout the World
450 Miller St., Benton Harbor, Michigan, U.S.A.

the receptacle plate and is held tightly in place with a center screw. After plug is inserted, a slight twist of plug collar locks it firmly in place.

Pin with Spiral Cross-Section

USE REPLY CARD—CIRCLE No. 21

Spirol pin, announced by C.E.M. Co., Danielson, Conn., is a coiled spring with physical properties that can be changed by varying the thickness of the strip, the tightness of the coils and the number of coils in the spiral. It is formed by rolling strip steel spirally. Pins can be used to fasten unlike materials such as brass and aluminum to steel, glass or plastic to metal, etc.

Large Diameter Head Rivet

USE REPLY CARD—CIRCLE No. 22

Huck Mfg. Co., Detroit 7, Mich., offers a low silhouette, large diameter head, blind rivet that provides an increased bearing area when fastening thin or soft material to metal framework. It is available in both aluminum and steel in pull through (R949) or self-plugging (R974) types in $\frac{1}{8}$, 3/16 and $\frac{1}{4}$-inch diameters.

Protection Against Chemicals

USE REPLY CARD—CIRCLE No. 23

Hyflex gloves, introduced by Houghton Laboratories Inc., Olean, N. Y., are canvas gloves coated with a tough, abrasion-resistant vinyl plastisol. They are made by a new centrifugal process. The gloves can be used in temperatures ranging from freezing to 200° F.

Die Sets Improved

USE REPLY CARD—CIRCLE No. 24

Producto Machine Co., Bridgeport, Conn., offers improved die sets with greater strength. One long, smoothly machined rear pad on punch and die holder assures uniformly accurate location of pin and bushing holes. Straight rear pad also allows more layout and mounting area on punch holder.

Compact Gang Channel

USE REPLY CARD—CIRCLE No. 25

Kaylock gang channel, a multiple locknut fastener, is introduced by Kaynar Mfg. Co. Inc., Los Angeles, Calif. Made of 24 ST Alclad

TIME Saving

with 842 sizes... of completely machined and finished Bunting Bronze Bearings for applications in machine tools and industrial machinery of all kinds.

with 316 sizes... of Bunting Bronze Bearings for all popular makes and sizes of electric motors. Completely finished, ready for installation.

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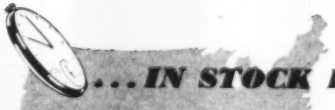

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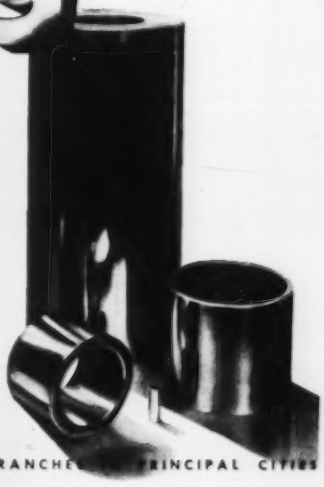

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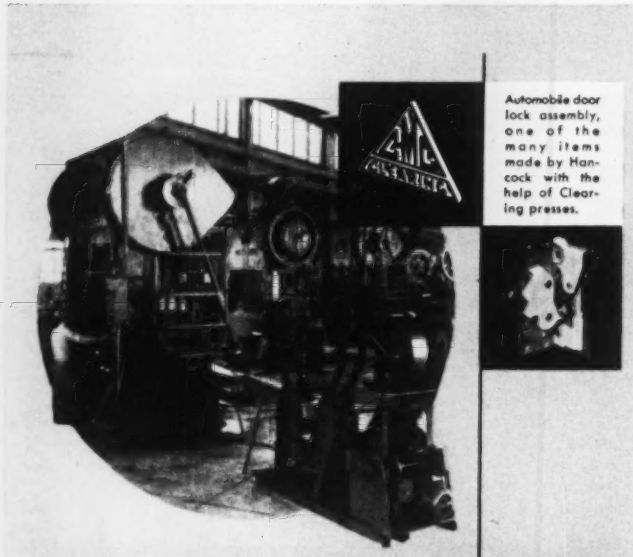

VALUE at a FAST PACE

In Jackson, Michigan, the Hancock Mfg. Co., producers of automobile hardware, like the way this bank of Clearing presses stick to their jobs. Long experience with high-volume, high-tempo, production runs has made Hancock a pretty good judge of press stamina.

Their Clearings are giving steady performance at high speed with practically no maintenance. Die regrinds are infrequent because Clearing's precision slide action holds die wear to a minimum.

Advantages like these mean a lot to Hancock... and to you, too. For production your best choice is Clearing.

CLEARING MACHINE CORPORATION
6499 WEST 65TH STREET ★ CHICAGO 38, ILLINOIS
HAMILTON DIVISION, HAMILTON, OHIO

CLEARING PRESSES
THE WAY TO EFFICIENT MASS PRODUCTION

aluminum alloy, the channel portion features a double vertical wall, providing high push out resistance, plus maximum rigidity, thereby requiring less riveting for attaching. It is made in sizes ranging from 8-32 through $\frac{1}{4}$-inch-28.

Portable Heating Units

USE REPLY CARD—CIRCLE No. 26

Portable heating units are available from E. L. Wiegand Co., Pittsburg 8, Pa., in three models. They are $24\frac{1}{2}$ inches long, 800 w; $30\frac{3}{4}$ inches, 1100 w; $46\frac{3}{4}$ inches, 1800 w. They are equipped with a 6-inch length of BX cable and plug and two movable mounting clamps and bolts.

Eliminates Jigs and Fixtures

USE REPLY CARD—CIRCLE No. 27

The 12-inch Super-Spacer, introduced by Hartford Special Machinery Co., Hartford 12, Conn., eliminates the use of jigs and fixtures. Unit includes a 48-notch master index plate, a set of eight mask places for 2, 3, 4, 6, 8, 12, 16 and 24 divisions, and T-handle socket wrench. Special index plates can be provided.

Spare Parts Kit

USE REPLY CARD—CIRCLE No. 28

Kits containing complete sets of normal wearing parts for Life-Linestarters are available from Westinghouse Electric Corp., Pittsburgh 30, Pa. They contain replacement moving contacts, moving contact springs and stationary contacts. Six different kits cover two and three-pole starters in sizes N0, N1 and N2.

Combustion Boats

USE REPLY CARD—CIRCLE No. 29

Combax combustion boats and covers, available from Fisher Scientific Co., Pittsburgh 19, Pa., are blank free and will not crack or

USE A
REPLY CARD
Just circle the corresponding number of any item in this section for more information.

Yours FOR THE ASKING

TEAR OUT CARD, FILL IN and MAIL TODAY!

71. Demineralizer

Penfield Mfg. Co.—Specifications and performance chart from which operating costs can be estimated are found in 2-page data sheet on model M Mono-Bed demineralizer. Picture of unit, diagram that identifies parts and parts descriptions also are included. Units have flow rates from 10 to 10,000 gph.

72. Mobile Crane

Unit Crane & Shovel Corp.—"It's self-propelled, rides on rubber and it's so easy to handle" states this 6-page illustrated catalog and specification sheet on No. 1520 mobile crane. Crane is rated ¾-yd for excavating service and has lifting capacity up to 20 tons. Mounting is on 12 pneumatic tires.

73. Wire Rope

Macwhyte Co.—Breaking strength and weight in pounds per foot are among interesting facts presented on Whyte Strand wire rope in 4-page illustrated bulletin 50-25. Classifications include 6 x 7, 6 x 19, 6 x 37, 8 x 19 and 18 x 7 (number of wires x number of strands in each wire). Info on how to order wire rope is included.

74. Industrial Scales

Toledo Scale Co.—Seventeen sections set up according to type of industrial scale can be found in the 128 pages of this illustrated catalog. Specifications are given on bench, portable, floor and counting scales, also Printweigh models. Special force measuring, balancing and testing devices are covered.

75. Soldering & Brazing

Metallizing Co. of America—Recently published is this illustrated 8-page brochure "Mogul Soldering & Brazing Equipment" which describes the Mogul soldering gun and shows its application to production line soldering and brazing. Gun is capable of soldering 60 lineal fpm on rectangular cans.

76. Spectrometric Equipment

North American Philips Co.—60-page illustrated catalog "X-ray Diffraction and Geiger-Counter X-ray Spectrometric Equipment" deals with apparatus for research, development and inspection. X-ray diffraction is nondestructive means for analyzing the basic structure of a solid. Use of spectrometer with diffraction unit speeds and simplifies the interpretation.

77. Industrial Freezers

Webber Appliance Co., Industrial Div.—If your processing calls for equipment capable of producing and holding temperatures as low as —165° F, then one of the 45 industrial freezers listed in condensed specification bulletin might be the answer. Sizes range from 4 to 45 cu ft and produce —40, —80, —100, —125, —150 and —165° F.

78. Testing Equipment

General Electric Co.—80-page illustrated catalog summarizes all of company's testing and measuring equipment for laboratory and production line use. It contains over 150 photographs and diagrams and describes uses, features and specifications of over 130 pieces of equipment. References to bulletins describing each device in more detail are also included in catalog GEC-1016.

79. Rolling Mills & Accessories

E. W. Bliss Co.—In addition to full information on rolling mills, you'll find several practical tables of technical data related to rolling mill practice in 54-page illustrated catalog "Rolling Mills and Accessories." Representative auxiliaries covered include edgers, roll changers, drives, coilers, flatteners, trimmers, choppers, run-out tables, coil lifts and shears.

STEEL
Penton Building, Cleveland 13, Ohio

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80. Corrugated Packaging

Hinde & Dauch Paper Co.—You'll find valuable packaging hints presented in 24-page pocket-size booklet "How to Ship Heavy Products in Corrugated Shipping Boxes." Booklet is No. 12 of a batch comprising the "Little Packaging Library." Shipping of nails, nuts, bolts, washers, screws and similar items is discussed and box styles are cataloged.

81. Rubber-Tired Crane

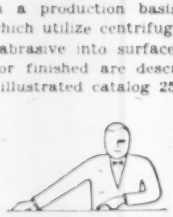
Unit Crane & Shovel Corp.—Here's a tool that can serve you well as crane, dragline, shovel and trench hoe. It is the No. 357 mobile crane, described and illustrated in 6-page catalog and specification sheet L-301. Lifting capacity ranges up to 18,000 lb with outriggers and 9800 lb without them.

82. Carbon & Graphite Products

National Carbon Co.—All the latest information on carbon and graphite brick for chemical, processing and metallurgical industries is to be found in revised catalog section S-6210. Complete tables cover brick sizes, shapes, grades and physical properties. Also announced are graphite beams, plates and rods in sizes up to 24 x 30 x 180 in.

83. Blast Cleaning & Finishing

American Wheelabrator & Equipment Co.—Tumblast is a modern method of blast cleaning and finishing metal products such as castings, forgings, stampings and heat treated parts on a production basis. Machines which utilize centrifugal force to hurl abrasive into surfaces to be cleared or finished are described in 16-page illustrated catalog 254-A.



84. Sprockets

Farrell-Cheek Steel Co.—Practically every conceivable type of sprocket is tabulated in 12-page illustrated catalog 21. Number of teeth, pitch diameter and outside diameter of available types are listed.

85. High Pressure Pumps

Byron Jackson Co.—Whether it's pumping water from the bottom of Grand Canyon, feeding high pressure boilers or supplying 6600 psi pressure for hydraulic presses, BJ Hydropress centrifugal pumps will do the job. For complete information on these high pressure, low volume units, get a copy of 12-page illustrated bulletin 48-6400.

86. White Printing Units

Peck & Harvey—The equipment for making sharp, clear, easy-to-read black, blue, maroon or sepia line positive prints by moist-diazo (semi-dry) and ammonia-fume (dry) methods is described and illustrated in 4-page bulletin 247. Spee-Dee white-printing outfits are made in three sizes for prints up to 12 x 18, 18 x 24 and 24 x 36 in. Suggestions for printing and developing speed, economy and utility are presented.

EDITORIAL REPRINTS:

87. High Strength Bolts

Here is a reprint of a brief article entitled "High Strength Bolts" which appeared in STEEL's December 24th issue. It points out advantages and long range economy of using bolts in structural work. Classes of structures considered are those subjected to fluctuating dynamic loading such as bridges and certain industrial equipment, and those subjected to static loading.

88. Who's Who in Defense

If you find it necessary to contact key government defense personnel on matters pertinent to your segment of metalworking, you'll find this directory entitled "Who's Who in the Defense Organization" very helpful. Names were obtained from Office of Defense Mobilization and compiled by STEEL according to the various agencies.

89. Future For Metalworking

Reprint entitled "Metalworking's Destiny" forcefully points to the gradual loss of industry's most valuable asset—the incentive to produce. Editorial, however, optimistically lists broad, far-reaching steps nation must take to restore this incentive and realize its industrial destiny.

90. Metalworking Data

Now available to STEEL readers in reprint form is the 48-page fourth edition of "Metalworking Facts and Figures" which tabulates the latest statistics. Contents trace raw materials all the way through to end products of metal consuming industries. Related subjects such as labor, prices and earnings are also covered.

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3	13	23	33	43	53	63	73	83
4	14	24	34	44	54	64	74	84
5	15	25	35	45	55	65	75	85
6	16	26	36	46	56	66	76	86
7	17	27	37	47	57	67	77	87
8	18	28	38	48	58	68	78	88
9	19	29	39	49	59	69	79	89
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2-4-52

Please send literature or detailed information on subjects circled at left to—

NAME _____ TITLE _____

COMPANY _____

PRODUCTS MANUFACTURED _____

ADDRESS _____

CITY AND STATE _____

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burn through at temperatures as high as 2400 F. Used for holding steel samples during carbon and sulphur determinations, their sample area is 80 x 8 x 6 mm.

Waterproof Toggle Switches

USE REPLY CARD—CIRCLE No. 30

Riverside Mfg. & Electrical Supply Co., Dearborn, Mich., has developed a series of waterproof toggle switches. The switches open and close electrical circuits underwater and are said to function perfectly from 65 degrees below zero to 165 degrees above and withstand salt spray, shock and vibration. Switches are furnished with ratings from 20 to 200 amp, in toggle arrangements of momentary on or off and stationary on or off, with one or two hole mounting

Filler Material

USE REPLY CARD—CIRCLE No. 31

Cold Solder, a filler material for blowholes, fractures in castings, patterns and similar uses, is available from A. L. Okun Co., Flushing 55, New York, N. Y. It is a powdered aluminum in a quick drying nonsoluble liquid vehicle. The vehicle evaporates leaving deposited aluminum in a smooth surface that will not crack, chip, peel or shrink. Material is applied from the can with a putty knife.

Monochromatic Light

USE REPLY CARD—CIRCLE No. 32

Acme Scientific Co., Chicago 7, Ill., introduces a monochromatic light for making light wave measurements in shop or laboratory. Used in conjunction with optical flats it avoids the necessity of exact placement of the work and makes inspection fast and easy. As light is emitted in a single wave length, interference bands appear clear and sharp. Bands appear light and dark only.

USE A
REPLY CARD
Just circle the corresponding number of any item in this section for more information

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Production Life Increased 900% by Hard-Facing Here

. . . and still no sign of wear!

A $\frac{3}{16}$-in. layer of HAYNES STELLITE hard-facing alloy protects this punch mandrel from severe wear and galling. The hard-faced mandrel, used in the manufacture of pipe couplings, has already produced 10,000 pieces and still shows no sign of losing gage. Tool steel parts in this same service wore out after punching only 1,000 pieces; and punches of case-hardened steel had to be replaced after producing 500 couplings.

The couplings are made from pipe of $\frac{1}{8}$-in. wall thickness and $5\frac{9}{16}$ in. diameter. Under a pressure of 20 tons, the pipes are expanded to $6\frac{7}{8}$ in. in diameter at the rate of one every two minutes. In this severe forming operation, the hard-faced ring on the mandrel stays out-to-gage 10 times as long as a tool steel ring and 20 times as long as a case-hardened steel ring. In addition, it does not gall and mark the inside diameter of the pipes.

Hard-facing is often the answer to serious wear problems in all types of machinery and equipment. By reducing wear at key points, it helps to cut maintenance costs and keep machinery running at peak efficiency. Write for the folder "Hard-Facing Materials Data" for a quick summary of HAYNES hard-facing alloys. It gives chemical composition, properties, uses, and forms of each alloy.

HAYNES TRADE MARK *alloys*

Haynes Stellite Company
A Division of
Union Carbide and Carbon Corporation
UCC
General Offices and Works, Kokomo, Indiana
Sales Offices
Chicago — Cleveland — Detroit — Houston
Los Angeles — New York — San Francisco — Tulsa

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The Market Outlook

MARKET attention is focused on steel prices at the moment. What may prove to be another hassle appears in the making. Senator Capehart threatens a bill repealing his price amendment to the economic controls law if it is used to increase steel prices in conjunction with a wage hike. This is significant since the government stabilizers last week proposed to the industry a formula under the Capehart amendment for determining ceiling prices. Actually, it is not certain just what this action means for it is not clear what, if any, price adjustments would result. Repricing of products would be permitted to reflect cost increases incurred between the outbreak of the Korean war and last July 26. But what about higher costs since the latter date? And what about an offset to a possible sharp wage hike now apparently in the making? These questions are being asked as the steelmakers seek to determine upon a course of action pending further meetings with OPS.

PROBLEM— Tie-up of wages and prices complicates the whole pricing problem. The steelmakers are in an increasingly uncomfortable position with a wage hike threatening on the horizon. Adjustments under the Capehart formula, at best, would cover only a part of their cost increases since Korea. They would in no way serve as an offset to a wage increase which possibly might warrant price increases up to $9 or $10 per ton alone. Generally, the steelmakers prefer a uniform increase to irregular adjustments, varying from company to company.

PRICES— There is no way of determining at this stage the extent of possible price increases under the Capehart formula. Producers must first file their applications with OPS for approval. At present, there is no tailored price ceiling on steel prices. These are established under voluntary agreement by producers not to effect increases without giving OPS 20 days' notice. Except for a few specialties, there have been no changes in over a year.

STABILITY— Wage-price determination can be expected soon. Expectations are that late this month you probably will know how much you will have to pay for steel. Meanwhile, producers are quoting prices at unchanged levels. STEEL's weighted index on finished steel holds at 171.92 as does the arithmetical price composite at $106.32. Pig iron composites are firm with No. 2 foundry, $52.54, basic, $52.16, and malleable, $53.27.

SUPPLY— More signs of easier supply conditions are appearing as the mills receive order cancellations from civilian goods manufacturers affected by production cutbacks. Whether this easier supply situation will prove temporary pending adjustment to greater defense production remains to be seen. Cutbacks in civilian goods are largely reflected, but increasing production of the mills as more facilities come into operation also is a factor. Producers are meeting difficulty moving seconds and rejects. More openings are reported in rolling schedules and increasingly larger tonnage is being offered for prompt shipment. Buyers are becoming more cautious in ordering with inventories up, and more talk is heard of lifting allocation controls. Last week controls were lifted from chrome stainless steels.

PRODUCTS— Consumers of carbon steel with unhonored CMP tickets are having difficulty placing orders for April on a first-come-first-served basis, mandatory on the mills provided they have available tonnage, for the 15-day period beginning Feb. 1. Most producers have little left for April shipment, being booked full on orders from regular customers. Further, they anticipate substantial arrearages at the end of this quarter which they may have to work into schedules. For the most part, improved supply is in those products consumed chiefly in production of consumer durable hard goods. These include cold-rolled sheets and strip and certain specialties, such as silicon electrical sheets and enameling stock.

PRODUCTION— The Ohio river flood prevented steelmakers from attaining scheduled production last week, the national ingot rate holding unchanged at 99.5 per cent of capacity.

NATIONAL STEELWORKS OPERATIONS

DISTRICT INGOT RATES

Percentage of Capacity Engaged at Leading Production Points

	Week Ended Feb. 2	Change	Same Week 1951	Same Week 1950
Pittsburgh	100	— 3*	99	94.5
Chicago	102	+ 0.5*	100	97.5
Mid-Atlantic	99	0	101	84
Youngstown	108	+ 1	106	97
Wheeling	80	—20.5	97	101
Cleveland	98	+ 0.5*	76.5	97.5
Buffalo	104	0	104	101.5
Birmingham	104	0	100	100
New England	87	+ 4	92	78
Cincinnati	103	+ 2	104	101
St. Louis	86.5	+ 5	90.5	89
Detroit	106	— 1.5*	109	107
Western	95.5	— 8.5	103	90
Estimated national rate	99.5	0	101.5	94

Based on weekly steelmaking capacity of 2,082,617 tons in 1952; 1,999,034 tons for 1951; 1,928,721 tons for second half, 1950; 1,906,268 tons for first half, 1950.

*Change from revised rate for preceding week.

The Metalworking Outlook—p. 51 Production-Engineering News—p. 87

Composite Market Averages

FINISHED STEEL INDEX, Weighted:	Jan. 31 1952	Week Ago	Month Ago	Year Ago	5 Yrs Ago
Index (1935-39 av. = 100)	171.92†	171.92†	171.92†	171.92	117.00
Index in cents per lb	4.657†	4.657†	4.657†	4.657	3.194
ARITHMETICAL PRICE COMPOSITES:					
Finished Steel, NT	$106.32†	$106.32†	$106.32†	$106.32	$69.82
No. 2 Fdry. Pig Iron, GT	52.54	52.54	52.54	52.54	30.17
Basic Pig Iron, GT	52.16	52.16	52.16	52.16	29.56
Malleable Pig Iron, GT	53.27	53.27	53.27	53.27	30.79
Steelmaking Scrap, GT	43.00	43.00	43.00	48.00	31.17

Weighted finished steel index based on average shipments and Pittsburgh district prices of the following 14 representative products during 5-year base period 1935-39: Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL, Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

† Preliminary.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	Jan. 31 1952	Week Ago	Month Ago	Year Ago	5 Yrs Ago
Bars, H.R., Pittsburgh	3.70	3.70	3.70	3.70	2.60
Bars, H.R., Chicago	3.70	3.70	3.70	3.70	2.60
Bars, H.R., del. Philadelphia	4.223	4.223	4.223	4.18	2.98
Bars, C.F., Pittsburgh	4.55	4.55	4.55	4.55	3.20
Shapes, Std., Pittsburgh	3.65	3.65	3.65	3.65	2.50
Shapes, Std., Chicago	3.65	3.65	3.65	3.65	2.50
Shapes, del. Philadelphia	3.918	3.918	3.918	3.90	2.64
Plates, Pittsburgh	3.70	3.70	3.70	3.70	2.65
Plates, Chicago	3.70	3.70	3.70	3.70	2.65
Plates, Contesville, Pa.	4.15	4.15	4.15	4.15	2.65
Plates, Sparrows Point, Md.	3.70	3.70	3.70	3.70	2.65
Plates, Claymont, Del.	4.15	4.15	4.15	4.15	2.65
Sheets, H.R., Pittsburgh	3.60-75	3.60-75	3.60-75	3.60-75	2.50
Sheets, H.R., Chicago	3.60	3.60	3.60	3.60	2.50
Sheets, C.R., Pittsburgh	4.35	4.35	4.35	4.35	3.20
Sheets, C.R., Chicago	4.35	4.35	4.35	4.35	3.20
Sheets, C.R., Detroit	4.55	4.55	4.55	4.55	3.335
Sheets, Galv., Pittsburgh	4.80	4.80	4.80	4.80	3.55
Strip, H.R., Pittsburgh	3.75-4.00	3.75-4.00	3.75-4.00	3.75-4.00	2.50
Strip, H.R., Chicago	3.50	3.50	3.50	3.50	2.50
Strip, C.R., Pittsburgh	4.65-5.35	4.65-5.35	4.65-5.35	4.65-5.35	3.20
Strip, C.R., Chicago	4.90	4.90	4.90	4.90	3.30
Strip, C.R., Detroit	4.85-5.60	4.85-5.60	4.85-5.60	4.35-5.60	3.335
Wire, Basic, Pittsburgh	4.85-5.10	4.85-5.10	4.85-5.10	4.85-5.10	3.425
Nails, Wire, Pittsburgh	5.90-6.20	5.90-6.20	5.90-6.20	5.90-6.20	4.125
Tin plate, box, Pittsburgh	$8.70	$8.70	$8.70	$8.70	$5.75

SEMIFINISHED

Billets, forging, Pitts. (NT)	$66.00	$66.00	$66.00	$66.00	$50.00
Wire rods, ⅜ to ⅝", Pitts.	4.10-30	4.10-30	4.10-30	4.10-30	2.675

PIG IRON, Gross Ton

Bessemer, Pitts.	$53.00	$53.00	$53.00	$53.00	$31.00
Basic, Valley	52.00	52.00	52.00	52.00	30.00
Basic, del. Phila.	56.61	56.61	56.61	56.39	32.01
No. 2 Fdry., Pitts.	52.50	52.50	52.50	52.50	30.50
No. 2 Fdry., Chicago	52.50	52.50	52.50	52.50	30.50
No. 2 Fdry., Valley	52.50	52.50	52.50	52.50	30.50
No. 2 Fdry., Del. Phila.	57.11	57.11	57.11	56.89	32.51
No. 2 Fdry., Birm.	48.88	48.88	48.88	48.88	26.88
No. 2 Fdry. (Birm.) del. Cin.	55.49	55.49	55.49	55.58	31.75
Malleable, Valley	52.50	52.50	52.50	52.50	30.50
Malleable, Chicago	52.50	52.50	52.50	52.50	30.50
Charcoal, Lyles, Tenn.	66.00	66.00	66.00	66.00	47.50
Ferromanganese, Etna, Pa.	188.00	188.00	188.00	188.00	140.00*

* F.o.b., Pittsburgh.

SCRAP, Gross Ton (including broker's commission)

No. 1 Heavy Melt, Pitts.	$44.00	$44.00	$44.00	$51.50	$32.50
No. 1 Heavy Melt, E. Pa.	42.50	42.50	42.50	47.50	31.00
No. 1 Heavy Melt, Chicago	42.50	42.50	42.50	45.00	30.00
No. 1 Heavy Melt, Valley	44.00	44.00	44.00	51.25	32.50
No. 1 Heavy Melt, Cleve.	43.00	43.00	43.00	50.75	31.25
No. 1 Heavy Melt, Buffalo	43.00	43.00	43.00	51.50	33.00
Rails, Rerolling, Chicago	52.50	52.50	52.50	67.00	38.50
No. 1 Cast, Chicago	49.00*	49.00*	49.00*	62.00	42.50

* F.o.b. shipping point.

COKE, Net Ton

Beehive, Furn. Connlsvl.	$14.75	$14.75	$14.75	$14.75	$8.75-$9
Beehive, Fdry., Connlsvl.	17.50	17.50	17.50	17.50	9.75-10.00
Oven Fdry., Chicago	23.00	23.00	23.00	21.00	15.10

NONFERROUS METALS

Copper, del. Conn.	24.50	24.50	24.50	24.50	19.50-20.50
Zinc, E. St. Louis	19.50	19.50	19.50	17.50	10.50
Lead, St. Louis	18.50	18.50	18.50	18.50	12.80-.85
Tin, New York	121.50	103.00	103.00	183.00	70.00
Aluminum, del.	19.00	19.00	19.00	19.00	15.00
Antimony, Laredo, Tex.	50.00	50.00	50.00	42.00	28.25
Nickel, refinery, duty paid	56.50	56.50	56.50	50.50	35.00

PIG IRON

F.o.b. furnace prices quoted under GCPR as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax. Key to producing companies published on second following page.

PIG IRON, Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa. B2	$54.00	$54.50	$56.00	$55.50
Brooklyn, N.Y., del.		58.18	59.68	
Newark, del.	56.87	57.37	57.87	58.37
Philadelphia, del.	56.61	57.11	57.61	58.11
Birmingham District				
Alabama City, Ala. R2	48.38	48.88	....	....
Birmingham R2	48.38	48.88	....	....
Birmingham S9	48.38	48.88	....	....
Woodward, Ala. W15	48.38	48.88	....	....
Cincinnati, del.	....	55.49	....	....
Buffalo District				
Buffalo R2	52.00	52.50	53.00	....
Buffalo H1	52.00	52.50	53.00	....
Tonawanda, N.Y. W12	52.00	52.50	53.00	....
No. Tonawanda, N.Y. T9		52.50	53.00	....
Boston, del.	62.11	62.61	63.11	....
Rochester, N.Y., del.	54.88	55.38	55.88	....
Syracuse, N.Y., del.	55.91	56.41	56.91	....
Chicago District				
Chicago I-3	52.00	52.50	52.50	53.00
Gary, Ind. U5	52.00	....	52.50	....
Indiana Harbor, Ind. I-2	52.00		52.50	....
So. Chicago, Ill. W14	52.00	52.50	52.50	....
So. Chicago, Ill., Y1	52.00	52.50	52.50	....
So. Chicago, Ill. U5	52.00		52.50	53.00
Milwaukee, del.	54.08	54.58	54.58	55.08
Muskegon, Mich., del.	....	58.47	58.47	....
Cleveland District				
Cleveland A7	52.00	52.50	52.50	53.00
Cleveland R2	52.00	52.50	52.50	
Akron, O., del. from Cleve.	54.61	55.11	55.11	55.61
Lorain, O. N3	52.00	....	....	53.00
Duluth I-3	....	....	52.50	....
Erie, Pa. I-3	52.00	52.50	52.50	53.00
Everett, Mass. E1	....	57.50	58.00	....
Fontana, Calif. K1	58.00	58.50	....	....
Seattle, Tacoma, Wash., del.	....	60.66	....	....
Portland, Oreg., del.	....	60.66	....	....
Los Angeles, San Francisco, del.	60.16	60.66	....	....
Granite City, Ill. G4	53.90	54.40	54.90	....
St. Louis, del. (inc. tax)	54.66	55.16	55.66	....
Ironton, Utah, C11	52.00	52.50	....	....
Geneva, Utah, C11	52.00	52.50	....	....
Lone Star, Tex. L6	48.00	*48.50	48.50	....
Minnequa, Colo. C10	54.00	55.00	55.00	....
Pittsburgh District				
Neville Island, Pa. P6	....	52.50	52.50	53.00
Pitts., N &S. sides, Ambridge, Aliquippa, del.	....	53.80	53.80	54.30
McKees Rocks, del.	....	53.54	53.54	54.04
Lawrenceville, Homestead, McKeesport, Monaca, del.	....	54.07	54.07	54.57
Verona, del.	....	54.57	54.57	55.07
Brackenridge, del.	....	54.82	54.82	55.32
Bessemer, Pa. U5	52.00	....	52.50	53.00
Clairton, Rankin, So. Duquesne, Pa. U5	52.00	....	....	....
McKeesport, Pa. N3	52.00	....	....	53.00
Monessen, Pa. P7	54.00	....	52.50	53.00
Sharpsville, Pa. S6	....	....	55.00	55.50
Steelton, Pa. B2	54.00	54.50	55.00	55.50
Sweedland, Pa. A3	56.00	56.50	57.00	57.50
Toledo, O. I-3	52.00	52.50	52.50	53.00
Cincinnati, del.	57.47	57.97	....	....
Troy, N.Y. R2	54.00	54.50	55.00	55.50
Youngstown District				
Hubbard, O. Y1	52.00	52.50	52.50	....
Youngstown Y1	52.00	52.50	52.50	....
Youngstown Y5	52.00			53.00
Mansfield, O., del.	56.65	57.15	57.15	57.65

* Low phos, southern grade.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.50 for each 0.5% Si)

Jackson, O. O2, J1	$62.50
Buffalo H1	63.75

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for each 0.045% max. P)

Niagara Falls, N.Y. P15	$88.00
Keokuk, Iowa, Openhearth & Fdry., frt. allowed K2	92.50
Keokuk, OH & Fdry., 12½ lb piglets, 16% Si, frt. allowed K2	95.50
Wenatchee, Wash., OH & Fdry., frt. allowed K2	92.50

CHARCOAL PIG IRON, Gross Ton

(Low phos semi-cold blast; differential charged for silicon over base grade; also for hard chilling iron Nos. 5 & 6)

Lyles, Tenn. T3	$66.00

LOW PHOSPHOROUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$57.00
Steelton, Pa. B2	60.00
Philadelphia, delivered	63.37
Troy, N.Y. R2	60.00

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Semifinished and Finished Steel Products

Mill prices quoted under GCFR as reported to STEEL, Jan. 31, 1952; cents per pound except as otherwise noted. Code numbers following mill points indicate producing company; key on next two pages. Changes shown in Italics.

INGOTS, Carbon, Forging (NT)
Fontana,Calif. K1 ... $79.00
Munhall,Pa. U5 ... 52.00

INGOTS, Alloy (NT)
Detroit R7 ... $54.00
Fontana,Calif. K1 ... 80.00
Houston,Tex. S5 ... 62.00
Midland,Pa. C18 ... 54.00
Munhall,Pa. U5 ... 54.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bessemer,Pa. U5 ... $56.00
Clairton,Pa. U5 ... 56.00
Ensley,Ala. T2 ... 56.00
Fairfield,Ala. T2 ... 56.00
Fontana,Calif. K1 ... 75.00
Gary,Ind. U5 ... 56.00
Johnstown,Pa. B2 ... 56.00
Lackawanna,N.Y. B2 ... 56.00
Munhall,Pa. U5 ... 56.00
So.Chicago,Ill. U5 ... 56.00
So.Duquesne,Pa. U5 ... 56.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ... $66.00
Buffalo R2 ... 66.00
Canton,O. R2 ... 66.00
Clairton,Pa. U5 ... 66.00
Cleveland R2 ... 66.00
Conshohocken,Pa. A3 ... 73.00
Detroit R7 ... 69.00
Ensley,Ala. T2 ... 66.00
Fairfield,Ala. T2 ... 66.00
Fontana,Calif. K1 ... 85.00
Gary,Ind. U5 ... 66.00
Geneva,Utah C11 ... 66.00
Houston,Tex. S5 ... 74.00
Johnstown,Pa. B2 ... 66.00
Lackawanna,N.Y. B2 ... 66.00
LosAngeles B3 ... 85.00
Munhall,Pa. U5 ... 66.00
Seattle B3 ... 85.00
So.Chicago R2,U5,W14 ... 66.00
So.Duquesne,Pa. U5 ... 66.00
So.SanFrancisco B3 ... 85.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ... $70.00
Buffalo R2 ... 70.00
Canton,O. R2 ... 70.00
Canton,O.(29); T7 ... 66.00
Conshohocken,Pa. A3 ... 77.00
Detroit R7 ... 73.00
Fontana,Calif. K1 ... 89.00
Gary,Ind. U5 ... 70.00
Houston,Tex. S5 ... 78.00
Ind.Harbor,Ind. Y1 ... 70.00
Johnstown,Pa. B2 ... 70.00
Lackawanna,N.Y. B2 ... 70.00
LosAngeles B3 ... 90.00
Massillon,O. R2 ... 70.00
Midland,Pa. C18 ... 70.00
Munhall,Pa. U5 ... 70.00
So.Chicago R2,U5,W14 ... 70.00
So.Duquesne,Pa. U5 ... 70.00
Struthers,O. Y1 ... 70.00
Warren,O. C17 ... 70.00

ROUNDS, SEAMLESS TUBE (NT)
Canton,O. R2 ... $82.00
Cleveland R2 ... 82.00
Fontana,Calif. K1 ... 103.00
Gary,Ind. U5 ... 82.00
Massillon,O. R2 ... 82.00
So.Chicago,Ill. R2 ... 82.00
So.Duquesne,Pa. U5 ... 82.00

SHEET BARS (NT)
Fontana,Calif. K1 ... $89.00

SKELP
Aliquippa,Pa. J5 ... $3.45
Munhall,Pa. U5 ... 3.35
Warren,O. R2 ... 3.35
Youngstown R2, U5 ... 3.35

WIRE RODS
Alton,Ill. L1 ... 4.40
AlabamaCity,Ala. R2 ... 4.10
Buffalo W12 ... 4.10
Cleveland A7 ... 4.10
Donora,Pa. A7 ... 4.10
Fairfield,Ala. T2 ... 4.10
Fontana,Calif. K1 ... 4.90
Houston,Tex. S5 ... 4.50
Johnstown,Pa. B2 ... 4.10
Joliet,Ill. A7 ... 4.10
Los Angeles B3 ... 4.90
Minnequa,Colo. C10 ... 4.35
Monessen,Pa. P7 ... 4.30
No.Tonawanda,N.Y. B11 ... 4.10
Pittsburg,Calif. C11 ... 4.75
Portsmouth,O. P12 ... 4.30
Roebling,N.J. R5 ... 4.20
So.Chicago,Ill. R2 ... 4.10
SparrowsPoint,Md. B2 ... 4.20
Sterling,Ill.(1); N15 ... 4.10
Struthers,O. Y1 ... 4.10
Torrance,Calif. C11 ... 4.90
Worcester,Mass. A7 ... 4.40

SHEET STEEL PILING
Ind.Harbor,Ind. I-2 ... 4.45
Lackawanna,N.Y. B2 ... 4.45
Munhall,Pa. U5 ... 4.45
So.Chicago,Ill. U5 ... 4.45

STRUCTURALS
Carbon Std Stand., Shapes
AlabamaCity,Ala. R2 ... 3.60
Aliquippa,Pa. J5 ... 3.65
Bessemer,Ala. T2 ... 3.65
Bethlehem,Pa. B2 ... 3.70
Clairton,Pa. U5 ... 3.65
Fairfield,Ala. T2 ... 3.65
Fontana,Calif. K1 ... 4.25
Gary,Ind. U5 ... 3.65
Geneva,Utah C11 ... 3.65
Houston,Tex. S5 ... 4.05
Ind.Harbor,Ind. I-2 ... 3.65
Johnstown,Pa. B2 ... 3.70
KansasCity,Mo. S5 ... 4.25
Lackawanna,N.Y. B2 ... 3.70
LosAngeles B3 ... 4.25
Minnequa,Colo. C10 ... 4.10
Munhall,Pa. U5 ... 3.65
Niles,Calif.(22) P1 ... 4.85
Phoenixville,Pa. P4 ... 5.90
Portland,Oreg. O4 ... 4.50
Seattle B3 ... 4.30
So.Chicago,Ill. U5, W14 ... 3.65
So.SanFrancisco B3 ... 4.20
Torrance,Calif. C11 ... 4.25
Weirton,W.Va. W6 ... 3.90

Alloy Stand. Shapes
Clairton,Pa. U5 ... 4.35
Fontana,Calif. K1 ... 5.55
Munhall,Pa. U5 ... 4.35
So.Chicago,Ill. U5 ... 4.35

H.S., L.A. Stand. Shapes
Aliquippa,Pa. J5 ... 5.50
Bessemer,Ala. T2 ... 5.50
Bethlehem,Pa.(14) B2 ... 5.50
Clairton,Pa. U5 ... 5.50
Fairfield,Ala. T2 ... 5.50
Fontana,Calif. K1 ... 6.10
Gary,Ind. U5 ... 5.50
Geneva,Utah C11 ... 5.50
Ind.Harbor,Ind. I-2 ... 5.50
Ind.Harbor,Ind. Y-1 ... 6.00
Johnstown,Pa. B2 ... 5.50
Lackawanna,N.Y.(14) B2 ... 5.50
LosAngeles B3 ... 6.05
Munhall,Pa. U5 ... 5.50
Seattle B3 ... 6.10
So.Chicago,Ill. U5 ... 5.50
SoSanFrancisco B3 ... 6.00
Struthers,O. Y1 ... 6.00

Wide Flange
Bethlehem,Pa. B2 ... 3.70
Clairton,Pa. U5 ... 3.65
Fontana,Calif. K1 ... 4.65
Lackawanna,N.Y. B2 ... 3.70
Munhall,Pa. U5 ... 3.65
So.Chicago,Ill. U5 ... 3.65

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 ... 5.50
Lackawanna,N.Y. B2 ... 5.50
Munhall,Pa. U5 ... 5.45
So.Chicago,Ill. U5 ... 5.45

BEARING PILES
Munhall,Pa. U5 ... 3.65
So.Chicago,Ill. U5 ... 3.65

PLATES, High-Strength Low-Alloy
Aliquippa,Pa. J5 ... 5.65
Bessemer,Ala. T2 ... 5.65
Clairton,Pa. U5 ... 5.65
Cleveland J5, R2 ... 5.65
Conshohocken,Pa. A3 ... 5.90
Fairfield,Ala. T2 ... 5.65
Fontana,Calif.(30) K1 ... 6.25
Gary,Ind. U5 ... 5.65
Geneva,Utah C11 ... 5.65
Ind.Harbor,Ind. I-2 ... 5.65
Ind.Harbor,Ind. Y1 ... 6.15
Johnstown,Pa. B2 ... 5.65
Munhall,Pa. U5 ... 5.65
Pittsburgh J5 ... 5.65
Seattle B3 ... 6.55
Sharon,Pa. S3 ... 5.70
So.Chicago,Ill. U5 ... 5.65
SparrowsPoint,Md. B2 ... 5.65
Warren,O. R2 ... 5.65
Youngstown Y1 ... 6.15

PLATES, Open-Hearth Alloy
Claymont,Del. C22 ... 4.85
Coatesville,Pa. L7 ... 5.25
Conshohocken,Pa. A3 ... 5.05
Fontana,Calif. K1 ... 5.70
Gary,Ind. U5 ... 4.75
Johnstown,Pa. B2 ... 4.75
Munhall,Pa. U5 ... 4.75
Sharon,Pa. S3 ... 5.20
So.Chicago,Ill. U5 ... 4.75
SparrowsPoint,Md. B2 ... 4.75

FLOOR PLATES
Cleveland J5 ... 4.75
Conshohocken,Pa. A3 ... 4.75
Ind.Harbor,Ind. I-2 ... 4.75
Munhall,Pa. U5 ... 4.75
So.Chicago,Ill. U5 ... 4.75

PLATES, Ingot Iron
Ashland,c.l.(15); A10 ... 3.95
Ashland,l.c.l.(15); A10 ... 4.45
Cleveland,c.l. R2 ... 4.30
Warren,O.c.l. R2 ... 4.30

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ... 3.70
Aliquippa,Pa. J5 ... 3.70
Ashland,Ky.(15); A10 ... 3.70
Bessemer,Ala. T2 ... 3.70
Clairton,Pa. U5 ... 3.70
Claymont,Del. C22 ... 4.15
Cleveland J5, R2 ... 3.70
Coatesville,Pa. L7 ... 4.15
Conshohocken,Pa. A3 ... 4.15
Fairfield,Ala. T2 ... 3.70
Fontana,Calif.(30) K1 ... 4.30
Gary,Ind. U5 ... 3.70
Granite City,Ill. G4 ... 4.40
Geneva,Utah C11 ... 3.70
Harrisburg,Pa. C5 ... 6.30
Houston,Tex. S5 ... 4.10
Ind.Harbor,Ind. I-2, Y1 ... 3.70
Johnstown,Pa. B2 ... 3.70
Lackawanna,N.Y. B2 ... 3.70
Minnequa,Colo. C10 ... 4.30
Munhall,Pa. U5 ... 3.70
Pittsburgh J5 ... 3.70
Seattle B3 ... 4.60
Sharon,Pa. S3 ... 3.95
So.Chicago,Ill. U5, W14 ... 3.70
SparrowsPoint,Md. B2 ... 3.70
Steubenville,O. W10 ... 3.70
Warren,O. R2 ... 3.70
Weirton,W.Va. W6 ... 4.00
Youngstown R2, U5, Y1 ... 3.70

PLATES, Carbon A.R.
Fontana,Calif. K1 ... 5.45
Geneva,Utah C11 ... 4.85

PLATES, Wrought Iron
Economy,Pa. B14 ... 8.60

BARS, Hot-Rolled Carbon
AlabamaCity,Ala. R2 ... 3.70
Aliquippa,Pa. J5 ... 3.70
Alton,Ill. L1 ... 4.15
Atlanta,Ga. A11 ... 4.25
Bessemer,Ala. T2 ... 3.70
Buffalo R2 ... 3.70
Canton,O. R2 ... 3.70
Clairton,Pa. U5 ... 3.70
Cleveland R2 ... 3.70
Detroit R7 ... 4.15
Emeryville,Calif. J7 ... 4.45
Fairfield,Ala. T2 ... 3.70
Fontana,Calif. K1 ... 4.40
Gary,Ind. U5 ... 3.70
Houston,Tex. S5 ... 4.10
Ind.Harbor,Ind. I-2,Y1 ... 3.70
Johnstown,Pa. B2 ... 3.70
KansasCity,Mo. S5 ... 4.30
Lackawanna,N.Y. B2 ... 3.70
LosAngeles B3 ... 4.40
Milton,Pa. B6 ... 4.55
Minnequa,Colo. C10 ... 4.15
Niles,Calif. P1 ... 5.05
N.Tonawanda,N.Y. B11 ... 3.70
Pittsburg,Calif. C11 ... 4.40
Pittsburgh J5 ... 3.70
Portland,Oreg. O4 ... 4.65
Seattle B3, N14 ... 4.45
Struthers,O. Y1 ... 3.70
Torrance,Calif. C11 ... 4.40
Weirton,W.Va. W6 ... 3.85
So.Chicago R2, U5, W14 ... 3.70
So.Duquesne,Pa. U5 ... 3.70
So.SanFran.,Cal. B3 ... 4.45
Youngstown R2, U5 ... 3.70

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 ... 3.70
Atlanta A11 ... 4.25
Johnstown,Pa. B2 ... 3.70
Lackawanna,N.Y. B2 ... 3.70
Niles,Calif. P1 ... 5.05
Portland,Oreg. O4 ... 4.65
SanFrancisco S7 ... 4.85

BAR SIZE ANGLES; H.R. CARBON
Bethlehem,Pa. B2 ... 3.90

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 ... 4.30
Buffalo R2 ... 4.30
Canton,O. R2 ... 4.30
Canton,O.(29) T7 ... 3.95
Clairton,Pa. U5 ... 4.30
Detroit R7 ... 4.45
Ecorse,Mich. G5 ... 4.65
Fontana,Calif. K1 ... 5.35
Gary,Ind. U5 ... 4.30
Houston,Tex. S5 ... 4.70
Ind.Harbor,Ind. I-2, Y1 ... 4.30
Johnstown,Pa. B2 ... 4.30
KansasCity,Mo. S5 ... 4.90
Lackawanna,N.Y. B2 ... 4.30
LosAngeles B3 ... 5.35
Massillon,O. R2 ... 4.30
Midland,Pa. C18 ... 4.30
So.Chicago R2, U5, W14 ... 4.30
So.Duquesne,Pa. U5 ... 4.30
Struthers,O. Y1 ... 4.30
Warren,O. C17 ... 4.30
Youngstown U5 ... 4.30

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 ... 4.55
Gary,Ind. U5 ... 4.55
Youngstown U5 ... 4.55

BARS & SMALL SHAPES, H.R., High-Strength Low-Alloy
Aliquippa,Pa. J5 ... 5.55
Bessemer,Ala. T2 ... 5.55
Bethlehem,Pa. B2 ... 5.55
Clairton,Pa. U5 ... 5.55
Cleveland R2 ... 5.55
Fairfield,Ala. T2 ... 5.55
Fontana,Calif. K1 ... 6.60
Gary,Ind. U5 ... 5.55
Ind.Harbor,Ind. I-2 ... 5.55
IndianaHarbor,Ind. Y1 ... 6.05
Johnstown,Pa. B2 ... 5.55
Lackawanna,N.Y. B2 ... 5.55
LosAngeles B3 ... 6.25
Pittsburgh J5 ... 5.55
Seattle B3 ... 6.30
So.Duquesne,Pa. U5 ... 5.55
So.SanFrancisco B3 ... 6.30
Struthers,O. Y1 ... 6.05
Youngstown U5 ... 5.55

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ... 4.55
BeaverFalls,Pa. M12,R2 ... 4.55
Buffalo B5 ... 4.60
Camden,N.J. P13 ... 5.00
Carnegie,Pa. C12 ... 4.55
Chicago W18 ... 4.55
Cleveland A7, C20 ... 4.55
Detroit P17 ... 4.70
Donora,Pa. A7 ... 4.55
Elyria,O. W8 ... 4.55
FranklinPark,Ill. N5 ... 4.55
Gary,Ind. R2 ... 4.55
GreenBay,Wis. F7 ... 4.55
Hammond,Ind. L2, M13 ... 4.55
Hartford,Conn. R2 ... 5.10
Harvey,Ill. B5 ... 4.55
LosAngeles R2 ... 6.00
Mansfield,Mass. B5 ... 5.10
Massillon,O. R2, R8 ... 4.55
Monaca,Pa. S17 ... 4.55
Newark,N.J. W18 ... 5.00
Plymouth,Mich. P5 ... 4.80
Pittsburgh J5 ... 4.55
Putnam,Conn. W18 ... 5.10
Readville,Mass. C14 ... 5.10
St.Louis,Mo. M5 ... 4.95
So.Chicago,Ill. W14 ... 4.55
SpringCity,Pa. (5) K3 ... 5.00
Struthers,O. Y1 ... 4.55
Waukegan,Ill. A7 ... 4.55
Youngstown F3, Y1 ... 4.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ... 5.40
BeaverFalls,Pa. M12 ... 5.40
Bethlehem,Pa. B2 ... 5.40
Buffalo B5 ... 5.40
Camden,N.J. P13 ... 5.80
Canton,O. R2 ... 5.40
Canton,O.(29) T7 ... 4.90
Carnegie,Pa. C12 ... 5.40
Cleveland A7 ... 5.45
Cleveland C20 ... 5.40
Detroit P17 ... 5.55
Donora,Pa. A7 ... 5.45
Elyria,O. W8 ... 5.40
Gary,Ind. R2 ... 5.40
Hammond,Ind. L2, M13 ... 5.40
Hartford,Conn. R2 ... 5.85
Harvey,Ill. B5 ... 5.40
Lackawanna,N.Y. B2 ... 5.40
Mansfield,Mass. B5 ... 5.85
Massillon,O. R2, R8 ... 5.40
Midland,Pa. C18 ... 5.40
Monaca,Pa. S17 ... 5.40
Newark,N.J. W18 ... 5.75
Plymouth,Mich. P5 ... 5.60
So.Chicago,Ill. R2, W14 ... 5.40
Struthers,O. Y1 ... 5.40
Warren,O. C17 ... (5.40)
Waukegan,Ill. A7 ... 5.45
Worcester,Mass. A7 ... 5.75
Youngstown F3, Y1 ... 5.40

RAIL STEEL BARS
Chicago Hts.(3,4) C2 ... 4.75
ChicagoHts.(3,4) I-2 ... 4.75
Franklin,Pa.(3,4) F5 ... 4.75
FortWorth,Tex.(25) T4 ... 4.85
Huntngtn,W.Va.(3) W7 ... 5.50
Marion,O.(3) P11 ... 4.75
Moline,Ill.(3) R2 ... 3.80
Tonawanda(3,4) B12 ... 4.75
Williamsport(3) S19 ... 5.00
Williamsport(4) S19 ... 5.10

BARS, Wrought Iron
Dover,N.J.(Staybolt) U1 ... 15.00
Dover,(Eng.Bolt) U1 ... 13.50
Dover,(Wrgh.Iron) U1 ... 12.25
Economy,Pa.(S.R.) B14 ... 9.60
Economy,Pa.(D.R.)B14 ... 11.90
Economy,(Staybolt)B14 ... 12.20
McK.Rks.(Staybolt)L5 ... 14.50
McK.Rks.(S.R.) L5 ... 9.60
McK.Rks.(D.R.) L5 ... 13.00

BARS, Reinforcing (Fabricators)
AlabamaCity,Ala. R2 ... 3.70
Atlanta A11 ... 4.25
Buffalo R2 ... 3.70
Cleveland R2 ... 3.70
Emeryville,Calif. J7 ... 4.45
Fairfield,Ala. T2 ... 3.70
Fontana,Calif. K1 ... 4.40
Gary,Ind. U5 ... 3.70
Houston,Tex. S5 ... 4.10
Ind.Harbor,Ind. I-2, Y1 ... 3.70
Johnstown,Pa. B2 ... 3.70
KansasCity,Mo. S5 ... 4.30
Lackawanna,N.Y. B2 ... 3.70
LosAngeles B3 ... 4.40
Milton,Pa. B6 ... 4.55
Minnequa,Colo. C10 ... 4.15
Monaca,Pa. S17 ... 4.40
Niles,Calif. P1 ... 5.05
Pittsburg,Calif. C11 ... 4.40
Pittsburgh J5 ... 3.70
Seattle B3, N14 ... 4.45
So.Chicago,Ill. R2 ... 3.70
So.Duquesne,Pa. U5 ... 3.70
So.SanFrancisco B3 ... 4.45
SparrowsPoint,Md. B2 ... 3.70
Struthers,O. Y1 ... 3.70
Torrance,Calif. C11 ... 4.40
Youngstown R2, U5 ... 3.70

BARS, Reinforcing (Fabricated; to Consumers)
Huntington,W.Va. W7 ... 5.50
Johnstown, ¼-1" B2 ... 4.75
LosAngeles B3 ... 5.45
Marion,O. P11 ... 5.00
Seattle B3, N14 ... 5.55
So.SanFrancisco B3 ... 5.45
SparrowsPt. ¼-1" B2 ... 4.75
Williamsport,Pa. S19 ... 5.10

SHEETS, Hot-Rolled Steel (18 gage and heavier)
AlabamaCity,Ala. R2 ... 3.60
Ashland,Ky.(8) A10 ... 3.60
Butler,Pa. A10 ... 3.60
Cleveland J5, R2 ... 3.60
Conshohocken,Pa. A3 ... 4.00
Detroit M1 ... 4.40
Ecorse,Mich.(8) G5 ... 3.80
Fairfield,Ala. T2 ... 3.60
Fontana,Calif. K1 ... 4.55
Gary,Ind. U5 ... 3.60
Geneva,Utah C11 ... 3.70
GraniteCity,Ill. G4 ... 4.30
Ind.Harbor,Ind. I-2, Y1 ... 3.60
Irvin,Pa. U5 ... 3.60
Lackawanna,N.Y. B2 ... 3.60
Munhall,Pa. U5 ... 3.60
Niles,O. N12 ... 5.25
Pittsburg,Calif. C11 ... 4.30
Pittsburgh J5 ... 3.60
Sharon,Pa. S3 ... 4.00
So.Chicago R2, W14 ... 3.60
SparrowsPoint,Md. B2 ... 3.60
Steubenville,O. W10 ... 3.60
Torrance,Calif. C11 ... 4.30
Warren,O. R2 ... 3.60
Weirton,W.Va. W6 ... 3.60
WestLeechburg,Pa. A4 ... 3.75
Youngstown U5, Y1 ... 3.60

SHEETS, H.R., (19 gage)
AlabamaCity,Ala. R2 ... 4.75
Dover,O. R1 ... 5.65
Ind.Harbor,Ind. I-2 ... 5.40
Mansfield,O. E6 ... 5.65
Niles,O. N12 ... 6.75
Torrance,Calif. C11 ... 5.40

SHEETS, H.R., (14-ga., heavier) High-Strength Low-Alloy
Cleveland J5, R2 ... 5.40
Conshohocken,Pa. A3 ... 5.65
Ecorse,Mich. G6 ... 5.95
Fairfield,Ala. T2 ... 5.40
Fontana,Calif. K1 ... 6.35
Gary,Ind. U5 ... 5.40
Ind.Harbor,Ind. I-2 ... 5.40
IndianaHarbor,Ind. Y1 ... 5.90
Irvin,Pa. U5 ... 5.40
Lackawanna(35) B2 ... 5.40
Pittsburgh J5 ... 5.40
Sharon,Pa. S3 ... 5.40
So.Chicago,Ill. U5 ... 5.40
SparrowsPoint(36) B2 ... 5.40
Warren,O. R2 ... 5.40
Weirton,W.Va. W6 ... 5.75
Youngstown U5 ... 5.40
Youngstown Y1 ... 5.90

SHEETS, Cold-Rolled High-Strength Low-Alloy
Cleveland J5, R2 ... 6.55
Ecorse,Mich. G5 ... 7.10
Fontana,Calif. K1 ... 7.50
Gary,Ind. U5 ... 6.55
IndianaHarbor,Ind. Y1 ... 7.06
IndianaHarbor,Ind. I-2 ... 6.55
Irvin,Pa. U5 ... 6.55
Lackawanna(37) B2 ... 6.55
Pittsburgh J5 ... 6.55
SparrowsPoint(38) B2 ... 6.55
Warren,O. R2 ... 6.55
Weirton,W.Va. W6 ... 6.90
Youngstown Y1 ... 7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10	4.35
Cleveland J5	4.35
Ecorse,Mich. G5	4.35
Fairfield,Ala. T2	4.35
Follansbee,W.Va. F4	5.35
Fontana,Calif. K1	5.30
Gary,Ind. U5	4.35
Granite City,Ill. G4	5.05
Ind.Harbor,Ind. I-2 Y1	4.35
Irvin,Pa. U5	4.35
Lackawanna,N.Y. B2	4.35
Middletown,O. A10	4.35
Pittsburg,Calif. C11	5.30
Pittsburgh J5	4.35
SparrowsPoint,Md. B2	4.35
Steubenville,O. W10	4.35
Warren,O. R2	4.35
Weirton,W.Va. W6	4.35
Youngstown Y1	4.35

SHEETS, Cold'd No. 10 Steel

Alabama City,Ala. R2	4.80
Ashland,Ky. (8) A10	4.80
Canton,O. R2	4.80
Dover,O. R1	5.50
Fairfield,Ala. T2	4.80
Gary,Ind. U5	4.80
Granite City,Ill. G4	5.50
Ind.Harbor,Ind. I-2	4.80
Irvin,Pa. U5	4.80
Kokomo,Ind.(13) C16	5.20
Martins Ferry,O. W10	4.80
New,O. N12	6.00
Pittsburg,Calif. C11	5.55
SparrowsPoint,Md. B2	4.80
Steubenville,O. W10	4.80
Torrance,Calif. C11	5.55
Weirton,W.Va. W6	4.80

SHEETS, Galvanized No. 10, High Strength Low-Alloy

Irvin,Pa. U5	7.20
SparrowsPoint(39) B2	6.75

SHEETS, Galvannealed Steel

Canton,O. R2	5.35
Irvin,Pa. U5	5.35
Kokomo,Ind.(13) C16	5.75
Niles,O. N12	6.55

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10	5.05
Middletown,O. A10	5.05

SHEETS, Electro Galvanized

Cleveland R2 (28)	5.65
Niles,O. R2 (28)	5.65
Weirton,W.Va. W6	5.50

SHEETS, Zinc Alloy

Ind.Harbor,Ind. I-2	5.70

SHEETS, Drum Body

Pittsburg,Calif. C11	4.30
Torrance,Calif. C11	4.30

SHEETS, Well Casing

Fontana,Calif. K1	5.10

BLUED Stock, 29 ga.

Yorkville,O. W10	6.80
Follansbee,W.Va.(23) F4	6.85

TIN PLATE, Electrolytic (Base Box)

	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.10	$7.40	$7.80
Fairfield,Ala. T2	7.25	7.50	7.90
Gary,Ind. U5	7.15	7.40	7.80
Granite City,Ill. G4	7.35	7.60	8.00
Ind.Harbor,Ind. I-2, Y1	7.15	7.40	7.80
Irvin,Pa. U5	7.15	7.40	7.80
Niles,O. R2	7.15	7.40	7.80
Pittsburg,Calif. C11	7.90	8.15	8.55
SparrowsPoint,Md. B2	7.25	7.50	7.90
Weirton,W.Va. W6	7.15	7.40	7.80
Yorkville,O. W10	7.15	7.40	7.80

SHEETS, SILICON, H.R. or C.R. (22 Ga.) COILS (Cut Lengths 1/2c lower)

	Field	Armature	Electric	Motor	Dynamo
Beech Bottom,W.Va.(cut lengths)			7.25	8.50	9.30
Brackenridge,Pa. A4			7.75	9.00	9.80
Granite City,Ill. G4 (cut lengths)			7.95	9.20	...
Ind.Harbor,Ind. I-2	6.95	7.25	(34)	...	...
Mansfield,O. E6 (cut lengths)	7.10	7.25	7.75	9.00	9.80
Niles,O. N12 (cut lengths)	...	6.75	7.25	...	...
Vandergrift,Pa. U5	...	7.25	7.75	9.00	9.80
Warren,O. R2	6.95	7.25	7.75	9.00	9.80
Zanesville,O. A10	...	7.25	7.75	9.00	9.80

SHEETS, SILICON (22 Ga. Base) Coils (Cut Lengths 1/2c lower) Transformer Grade

	72	65	58	52
Beech Bottom,W.Va.(cut lengths)	9.85	10.40	11.10	11.90
Follansbee,Pa. A4	10.35	...	...	...
Vandergrift,Pa. U5	10.35	10.90	11.60	12.40
Warren,O. R2	10.35	...	...	...
Zanesville,O. A10	10.35	10.90	11.60	12.40

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22 Ga.)

	T-100	T-90	T-80	T-73
Butler,Pa. A10 (C.R.)	...	...	14.75	15.25
Vandergrift,Pa. U5	12.90	13.75	14.75	15.25

SHEETS, Enameling Iron

Ashland,Ky.(8) A10	4.65
Cleveland R2	4.65
Gary,Ind. U5	4.65
Granite City,Ill. G4	5.35
Ind.Harbor,Ind. I-2	4.65
Irvin,Pa. U5	4.65
Middletown,O. A10	4.65
Youngstown Y1	4.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$6.25
Fairfield,Ala. T2	6.35
Gary,Ind. U5	6.25
Granite City,Ill. G4	6.45
Ind.Harbor,Ind. I-2, Y1	6.25
Irvin,Pa. U5	6.25
Niles,O. R2	6.25
Pittsburg,Calif. C11	7.00
SparrowsPoint,Md. B2	6.35
Warren,O. R2	6.25
Weirton,W.Va. W6	6.25
Yorkville,O. W10	6.25

HOLLOWARE ENAMELING Black Plate (29 gage)

Follansbee,W.Va. F4	5.85
Gary,Ind. U5	5.65
Granite City,Ill. G4	6.05
Ind.Harbor,Ind. Y1	5.30
Irvin,Pa. U5	5.85
Yorkville,O. W10	6.15

SHEETS, Culvert No. 16 Pure Iron

Ashland,Ky. A10	5.85
Fairfield,Ala. T2	5.80

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland,Ky.(8) A10	3.85
Cleveland R2	4.20
Ind.Harbor,Ind. I-2	3.85
Warren,O. R2	4.20

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2	4.95
Middletown,O. A10	4.85
Warren,O. R2	4.95

SHEETS, Galvanized Ingot Iron No. 10 flat

Ashland,Ky.(8) A10	5.05
Canton,O. R2	5.55

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10	5.30
Middletown,O. A10	5.30

SHEETS, ALUMINIZED

Butler,Pa. A10	8.15

SHEETS, Culvert No. 16 Copper Alloy

	Cu	Cu Alloy
Ashland,Ky. A10	5.60	...
Canton,O. R2	5.65	6.10
Fairfield,Ala. T2	5.60	5.85
Gary,Ind. U5	5.60	5.85
Indiana Harbor I-2	5.60	5.85
Irvin,Pa. U5	5.60	5.85
Kokomo,Ind. C16	6.25	...
Martins Ferry,O. W10	5.60	5.85
Pittsburg,Cal. C11	6.35	...
SparrowsPt. B2	5.60	...
Torrance,Cal. C11	6.35	...

TINPLATE, American 1.25 Coke (Base Box)

	lb	lb
Aliquippa,Pa. J5	$8.45	$8.70
Fairfield,Ala. T2	8.55	8.80
Gary,Ind. U5	8.45	8.70
Ind.Har. I-2, Y1	8.45	8.70
Irvin,Pa. U5	8.45	8.70
Pitts.Cal. C11	9.20	9.45
Sp.Pt. Md. B2	8.55	8.80
Warren,O. R2	8.45	8.70
Weirton,W.Va. W6	8.45	8.70
Yorkville,O. W10	8.45	8.70

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	$7.60
Gary,Ind. U5	7.50
Irvin,Pa. U5	7.50
SparrowsPoint,Md. B2	7.60
Yorkville,O. W10	7.50

SHEETS, LT. Coated Ternes, 6 lb

Yorkville,O. W10	$8.40

SHEETS, Mfg. Ternes, 8 lb (Commercial Quality)

Gary,Ind. U5	$8.50
Yorkville,O. W10	9.50

SHEETS, Long Terne Steel (Commercial Quality)

Beech Bottom,W.Va. W10	5.20
Gary,Ind. U5	5.20
Mansfield,O. E6	6.05
Middletown,O. A10	5.20
Niles,O. N12	6.00
Weirton,W.Va. W6	5.20

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	5.60

ROOFING SHORT TERNES (8 lb Coated)

Gary,Ind. U5	9.50

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2	5.30
Conshohocken,Pa. A3	5.55
Ecorse,Mich. G5	5.95
Fairfield,Ala. T2	5.30
Fontana,Calif. K1	6.20
Gary,Ind. U5	5.30
Ind.Harb.,Ind. I-2	5.30
Indiana Harbor,Ind. Y1	5.80
Lackawanna,N.Y. B2	4.95
Los Angeles(25) B3	6.05
Seattle B3	6.30
Sharon,Pa. S3	5.40
So.San Francisco(25) B3	6.05
SparrowsPoint,Md. B2	4.95
Warren,O. R2	5.30
Weirton,W.Va. W6	5.75
Youngstown Y1	5.80
Youngstown U5	5.30

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland J5	6.70
Cleveland A7	6.55
Dover,O. G6	7.30
Fontana,Calif. K1	6.95
Lackawanna,N.Y. B2	6.40
Sharon,Pa. S3	6.55
SparrowsPoint,Md. B2	6.40
Warren,O. R2	6.55
Weirton,W.Va. W6	7.20
Youngstown Y1	7.05

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	3.50
Alton,Ill. L1	3.95
Ashland,Ky.(8) A10	3.90
Atlanta A11	4.05
Bessemer,Ala. T2	3.50
Bridgeport,Conn.(10) S15	4.00
Buffalo(27) R2	3.50
Butler,Pa. A10	3.50
Carnegie,Pa. S15	4.00
Conshohocken,Pa. A3	3.90
Detroit M1	4.40
Ecorse,Mich. G5	3.80
Fairfield,Ala. T2	3.50
Fontana,Calif. K1	4.75
Gary,Ind. U5	3.50
Houston,Tex. B5	3.90
Ind.Harbor,Ind. I-2, Y1	3.50
Johnstown,Pa.(25) B2	3.50
Kansas City,Mo.(9) S5	4.10
Lackawanna,N.Y.(32) B2	3.50
Los Angeles B3	4.25
Milton,Pa. B6	4.35
Minnequa,Colo. C10	4.55
New Britain(10) S15	4.00
No.Tonawanda,N.Y. B11	3.50
Pittsburg,Calif. C11	4.25
Riverdale,Ill. A1	3.50
San Francisco S7	4.85
Seattle B3, N14	4.50
Sharon,Pa. S3	4.00
So.Chicago,Ill. W14	3.50
So.San Francisco B3	4.25
SparrowsPoint,Md. B2	3.50
Torrance,Calif. C11	4.25
Warren,O. R2	3.50
Weirton,W.Va. W6	3.60
WestLeechburg,Pa. A4	3.75
Youngstown U5, Y1	3.50

STRIP, Hot-Rolled Alloy

Bridgeport,Conn.(10) S15	5.45
Carnegie,Pa. S15	5.85
Fontana,Calif. K1	6.70
Gary,Ind. U5	5.50
Houston,Tex. S5	5.90
Kansas City,Mo. S5	6.10

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	...	6.80	7.40	9.35	11.65
Carnegie,Pa. S15	...	6.80	7.40	9.35	11.65
Cleveland A7	4.65	6.45	7.40	9.35	11.65
Dearborn,Mich. D3	5.60	7.05	7.65	...	...
Detroit D2	5.60	6.65	7.25	...	...
Dover,O. G6	5.50	6.80	7.40	9.35	11.65
Franklin Park,Ill. T6	5.00	6.60	7.55	9.50	11.80
Harrison,N.J. C15	...	...	7.70	9.65	11.95
Mattapan,Mass. T6	5.50	6.75	7.70	9.65	11.95
New Britin,Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
New Castle,Pa. B4	5.35	6.80	7.40	9.35	...
New Castle,Pa. E5	5.50	6.80	7.40	9.35	11.65
New Haven,Conn. D2	5.85	6.75	7.35	...	...
New York W3	...	7.10	7.70	9.65	11.95
Pawtucket,R.I. N8: Cleve.or Pitts.Base	...	6.80	7.40	9.35	11.65
Worcester,Mass.,Base	5.85	7.10	7.70	9.65	11.95
Sharon,Pa. S3	5.35	6.80	7.40	9.35	11.65
Trenton,N.J. R5	...	7.10	7.70	9.65	11.95
Wallingford,Conn. W2	5.85	6.75	7.35	9.30	11.60
Weirton,W.Va. W6	5.35	6.80	7.40	9.35	11.65
Worcester,Mass. A7	4.95	6.75	7.70	9.65	11.95
Worcester,Mass. T6	5.50	6.75	7.70	9.65	11.95
Youngstown C8	...	6.80	7.40	9.35	11.65

Spring Steel (Tempered)

Trenton,N.J. R5	...	...	10.30	12.50	15.35
Harrison,N.J. C18	...	...	10.30	12.50	15.35
New York W3	...	...	10.30	12.50	15.35

STRIP, Cold-Rolled Carbon

Anderson,Ind.(40) G6	5.50
Berea,O. C7	6.60
Bridgeport,Conn.(10) S15	5.35
Butler,Pa. A10	4.65
Cleveland A7, J5	4.65
Dearborn,Mich. D3	5.60
Detroit D2	5.60
Detroit M1	5.45
Dover,O.(40) G6	5.50
Ecorse,Mich. G5	4.85
Follansbee,W.Va. F4	5.35
Fontana,Calif. K1	6.30
Franklin Park,Ill.(40) T6	4.90
Ind.Harbor,Ind. I-2	4.90
Lackawanna,N.Y. B2	4.85
Los Angeles C1	6.40
Mattapan,Mass. T6	5.50
Middletown,O. A10	4.65
New Britain(10) S15	5.35
New Castle,Pa. B4	5.35
New Castle,Pa.(40) E5	5.25
New Haven,Conn. D2	5.85
New Haven,Conn. A7	5.15
Pawtucket,R.I. R3	6.00
Pawtucket,R.I.(21) N8	5.85
Riverdale,Ill.(40) A1	4.90
Rome,N.Y. R6	5.10
Sharon,Pa. S3	5.35
SparrowsPoint,Md. B2	4.65
Trenton,N.J. R5	6.00
Wallingford,Conn. W2	5.85
Warren,O.(40) T5	5.25
Warren,O. R2	4.65
Weirton,W.Va. W6	4.65
Youngstown C8 (40)	5.25
Youngstown Y1	4.65

STRIP, Electro Galvanized

Dover,O. G6	5.50
Warren,O. T5	5.25
Weirton,W.Va. W6	4.65
Youngstown C8	5.25

Midland,Pa. C18	5.85
New Britin,Conn.(10) S15	5.45
Sharon,Pa. S3	5.55
Youngstown U5	5.50

STRIP, Cold-Rolled Carbon

Anderson,Ind.(40) G6	5.50
Berea,O. C7	6.60
Bridgeport,Conn.(10) S15	5.35
Butler,Pa. A10	4.65
Cleveland A7, J5	4.65
Dearborn,Mich. D3	5.60
Detroit D2	5.60
Detroit M1	5.45
Dover,O.(40) G6	5.50
Ecorse,Mich. G5	4.85
Follansbee,W.Va. F4	5.35
Fontana,Calif. K1	6.30
Franklin Park,Ill.(40) T6	4.90
Ind.Harbor,Ind. I-2	4.90
Lackawanna,N.Y. B2	4.85
Los Angeles C1	6.40
Mattapan,Mass. T6	5.50
Middletown,O. A10	4.65
New Britain(10) S15	5.35
New Castle,Pa. B4	5.35
New Castle,Pa.(40) E5	5.25
New Haven,Conn. D2	5.85
New Haven,Conn. A7	5.15
Pawtucket,R.I. R3	6.00
Pawtucket,R.I.(21) N8	5.85
Riverdale,Ill.(40) A1	4.90
Rome,N.Y. R6	5.10
Sharon,Pa. S3	5.35
SparrowsPoint,Md. B2	4.65
Trenton,N.J. R5	6.00
Wallingford,Conn. W2	5.85
Warren,O.(40) T5	5.25
Warren,O. R2	4.65
Weirton,W.Va. W6	4.65
Youngstown C8 (40)	5.25
Youngstown Y1	4.65

STRIP, Electro Galvanized

Dover,O. G6	5.50
Warren,O. T5	5.25
Weirton,W.Va. W6	4.65
Youngstown C8	5.25

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Boiardi Steel Corp.
B8 Braeburn Alloy Steel
B11 Buffalo Bolt Co.
B12 Buffalo Steel Co.
B14 A. M. Byers Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Corp.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Steel
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Frtez-Moon Tube Co.
F7 Ft. Howard Steel & Wire

G2 Globe Iron Co.
G3 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div. Borg-Warner Corp.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Electric Steel
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

STRIP, Cold-Rolled Alloy Steel

Bridgeprt,Conn.(10)	S15 10.75
Carnegie,Pa.	S18 10.60
Cleveland	A7 10.00
Dover,O.	G6 10.50
Fontana,Calif.	K1 11.65
Harrison,N.J.	C18 10.60
Midland,Pa.	C18 10.60
NewBrits,Conn.(10)	S15 10.75
Pawtucket,R.I.(11)	N8 10.75
Pawtucket,R.I.(12)	N8 11.05
Sharon,Pa.	S3 10.60
Worcester,Mass.	A7 10.30
Youngstown	C8 10.60

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.	(8) A10 3.75
Warren,O.	R2 4.10

STRIP, Cold-Rolled Ingot Iron

Warren,O.	R2 5.25

TIGHT COOPERAGE HOOP

Atlanta	A11 4.05
Riverdale,Ill.	A1 3.90
Sharon,Pa.	S3 4.15
Youngstown	U5 3.75

WIRE, Tire Bead

Bartonville,Ill.(1)	K4 10.90
Monessen,Pa.	P16 11.40
Roebling,N.J.	R5 11.55

WIRE, Merchant Quality

(6 to 8 gage)	An'ld Galv.
AlabamaCity	R2 5.70 5.95
Aliquippa	J5 5.70 6.15
Atlanta	A11 5.95 6.40
Bartonville(19)	K4 5.70 6.15
Buffalo	W12 4.85 —
Cleveland	A7 5.70 6.15
Crawfordsville	M8 5.95 6.40
Donora,Pa.	A7 5.70 6.15
Duluth,Minn.	A7 5.70 6.15
Fairfield	T2 5.70 6.15
Houston,Tex.	S5 6.10 6.55
Johnstown	B2 5.70 6.15
Joliet,Ill.	A7 5.70 6.15
KansasCy,Mo.	S5 6.30 6.75
Kokomo	C16 5.80 6.05
LosAngeles	B3 6.65 —
Minnequa	C10 5.95 4.45
Monessen	P7 5.95 6.40
Palmer	W12 5.15 —
Pitts.,Calif.	C11 6.65 6.80
Prtsmth.(18)	P12 6.10 6.60
Rankin	A7 5.70 6.15
So.Chicago	R2 5.70 5.95
So.S.Fran.	C10 6.65 7.10
SparrowsPt.	B2 5.85 6.25
Sterling,Ill.(1)	N15 5.70 6.15
Struthers,O.	Y1 5.70 6.15
Torrance,Cal.	C11 6.65 —
Worcester	A7 6.00 6.45

ROPE WIRE (A) (B)

Alton,Ill.	L1	8.65 8.90
Bartonville,Ill.	K4	8.55 8.80
Buffalo	W12	8.55 8.80
Fostoria,O.	S1	8.85 9.10
Johnstown,Pa.	B2	8.55 8.80
Monessen,Pa.	P16	8.55 8.80
Monessen,Pa.	P7	8.80 9.05
Palmer,Mass.	W12	8.85 9.10
Portsmouth,O.	P12	8.55 8.80
Roebling,N.J.	R5	8.85 9.10
SparrowsPt.	B2	8.65 8.90
Struthers,O.	Y1	8.55 8.80
Worcester	J4, T6	8.85 9.10

(A) Plow and Mild Plow.
(B) Improved Plow.

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala.	R2 4.85
Aliquippa,Pa.	J5 4.85
Atlanta	A11 5.10
Alton,Ill.	L1 5.05
Bartonville,Ill.(1)	K4 4.85
Buffalo	W12 4.85
Chicago	W13 5.10
Cleveland	A7, C20 4.85
Crawfordsville,Ind.	M8 5.10
Donora,Pa.	A7 4.85
Duluth,Minn.	A7 4.85
Fairfield,Ala.	T2 4.85
Fostoria,O.(24)	S1 5.35
Houston	S5 5.25
Johnstown,Pa.	B2 4.85
Joliet,Ill.	A7 4.85
KansasCity,Mo.	S5 5.45
Kokomo,Ind.	C16 4.95
LosAngeles	B3 5.80
Minnequa,Colo.	C10 5.10
Monessen,Pa.	P7 5.10
Newark,	6-8 ga. I-1 5.50
No.Tonawanda	B11 4.85
Palmer,Mass.	W12 5.15
Pittsburg,Calif.	C11 5.80
Portsmouth,O.	P12 5.25
Rankin,Pa.	A7 4.85
So.Chicago,Ill.	R2 4.85
So.SanFrancisco	C10 5.80
SparrowsPoint,Md.	B2 4.95
Sterling,Ill.(1)	N15 4.85
Struthers,O.	Y1 4.85
Torrance,Calif.	C11 5.80
Waukegan,Ill.	A7 4.85
Worcester,Mass.	A7, T6 5.15

WIRE, Cold-Rolled Flat

Anderson,Ind.	G6 6.20
Buffalo	W12 6.35
Cleveland	A7 5.85
Crawfordsville,Ind.	M8 6.20
Detroit	D2 6.20
Dover,O.	G6 6.20
Fostoria,O.	S1 6.00
Kokomo,Ind.	C16 5.70
FranklinPark,Ill.	T6 6.20
Massillon,O.	R8 5.85
Monessen,Pa.	P16 5.85
Monessen,Pa.	P7 6.10
NewHaven,Conn.	D2 6.50
Pawtucket,R.I.(12)	N8 6.85
Trenton,N.J.	R5 6.15
Worcester,Mass.	A7 6.15
Worcester,Mass.	T6 6.50
Worcester,Mass.	W12 6.65

WIRE, Galv'd ACSR for Cores

Bartonville,Ill.	K4 8.50
Monessen,Pa.	P16 8.50
Roebling,N.J.	R5 8.80
SparrowsPoint,Md.	B2 8.60
Johnstown,Pa.	B2 8.50

WIRE (16 gage)	An'ld Galv. Stone	Stone
Aliquippa	J5 10.15	12.15
Bartonville(1)	K4 10.25	11.95
Cleveland	A7 10.25	12.15
Crawfrdsville	M8 10.30	12.00
Fostoria,O.	S1 10.40	13.00
Johnstown	B2 10.25	12.15
Kokomo	C16 10.25	11.95
Minnequa	C10 10.40	12.40
Palmer,Mass.	W12 10.25	12.15
Pitts.Cal.	C11 10.60	12.50
Prtsmth.(18)	P12 10.55	12.30
SparrowsPt.	B2 10.35	12.25
Waukegan	A7 10.25	12.15

WIRE, MB Spring, High Carbon

Aliquippa,Pa.	J5 6.25
Alton,Ill.	L1 6.45
Bartonville,Ill.(1)	K4 6.25
Buffalo	W12 6.25
Cleveland	A7 6.25
Donora,Pa.	A7 6.25
Duluth,Minn.	A7 6.25
Fostoria,O.	S1 6.25
Johnstown,Pa.	B2 6.25
LosAngeles	B3 7.20
Milbury,Mass.	(12) N6 8.05
Monessen,Pa.	P7, P16 6.25
Palmer,Mass.	W12 6.55
Pittsburg,Calif.	C11 7.20
Roebling,N.J.	R5 6.55
Portsmouth,O.	P12 6.25
So.Chicago,Ill.	R2 6.25
So.SanFrancisco	C10 7.20
SparrowsPoint,Md.	B2 6.35
Struthers,O.	Y1 6.25
Trenton,N.J.	A7 6.55
Waukegan,Ill.	A7 6.25
Worcester,Mass.	A7 6.55
Worcester,Mass.	T6, W12 6.55
Worcester,Mass.	J4 6.75

WIRE, Fine & Weaving(8" Coils)

Bartonville,Ill.(1)	K4 8.90
Buffalo	W12 8.90
Chicago	W13 8.90
Cleveland	A7 8.90
Crawfordsville,Ind.	M8 8.95
Fostoria,O.	S1 8.90
Johnstown,Pa.	B2 8.90
Kokomo,Ind.	C16 8.90
Monessen,Pa.	P16 8.90
Palmer,Mass.	W12 9.20
Portsmouth,O.	P12 8.90
Roebling,N.J.	R5 9.20
Waukegan,Ill.	A7 8.90
Worcester,Mass.	A7, T6 9.20

WIRE, Barbed Col.

AlabamaCity,Ala.	R2 137
Aliquippa,Pa.	J5 141
Atlanta	A11 144
Bartonville,Ill.(19)	K4 144
Crawfordsville,Ind.	M8 146
Donora,Pa.	A7 141
Duluth,Minn.	A7 141
Fairfield,Ala.	T2 141
Houston,Tex.	S5 149
Johnstown,Pa.	B2 141
Joliet,Ill.	A7 141
KansasCity,Mo.	S5 153
Kokomo,Ind.	C16 143
Minnequa,Colo.	C10 147
Monessen,Pa.	P7 146
Pittsburg,Calif.	C11 161
Portsmouth,O.(18)	P12 148
Rankin,Pa.	A7 141
So.Chicago,Ill.	R2 137
So.SanFran.,Calif.	C10 161
SparrowsPoint,Md.	B2 143
Sterling,Ill.(1)	N15 141

BALE TIES, Single Loop Col.

AlabamaCity,Ala.	R2 123
Atlanta	A11 128
Bartonville,Ill.(19)	K4 123
Crawfordsville,Ind.	M8 132
Donora,Pa.	A7 123
Duluth,Minn.	A7 123
Fairfield,Ala.	T2 123
Joliet,Ill.	A7 123
KansasCity,Mo.	S5 135
Kokomo,Ind.	C16 125
Minnequa,Colo.	C10 128
Pittsburg,Calif.	C11 147
So.Chicago,Ill.	R2 123
So.SanFran.,Calif.	C10 147
SparrowsPoint,Md.	B2 125
Sterling,Ill.(1)	N15 123

WIRE,Upholstery Spring

Aliquippa,Pa.	J5 5.90
Alton,Ill.	L1 6.10
Buffalo	W12 5.90
Cleveland	A7 5.90
Donora,Pa.	A7 5.90
Duluth,Minn.	A7 5.90
Johnstown,Pa.	B2 5.90
LosAngeles	B3 6.85
Monessen,Pa.	P7, P16 5.90
New Haven,Conn.	A7 6.20
Palmer,Mass.	W12 6.20
Pittsburg,Calif.	C11 6.85
Portsmouth,O.	P12 5.90
Roebling,N.J.	R5 6.20
So.Chicago,Ill.	R2 5.90
So.SanFrancisco	C10 6.85
SparrowsPoint,Md.	B2 6.00
Torrance,Calif.	C11 6.85
Trenton,N.J.	A7 6.20
Waukegan,Ill.	A7 5.90
Worcester,Mass.	A7 6.20

WOVEN FENCE, 9-15½ Ga. Col.

AlabamaCity,Ala.	R2 127
Ala.City,Ala.	17-18ga.R2 214
Aliquippa,Pa.	9-14½ga.J5 131
Atlanta	A11 134
Bartonville,Ill.(19)	K4 131
Crawfordsville,Ind.	M8 133
Donora,Pa.	A7 131
Duluth,Minn.	A7 131
Fairfield,Ala.	T2 131
Houston,Tex.	S5 139
Johnstown,Pa.	B2 131
Johnstown,17ga.,6"	B2 208
Johnstown,17ga.4"	B2 208
Joliet,Ill.	A7 131
KansasCity,Mo.	S5 143
Kokomo,Ind.	C16 133
Minnequa,Colo.	C10 139
Monessen,Pa.	P7 136
Pittsburg,Calif.	C11 154
Portsmouth,O.(18)	P12 138
Rankin,Pa.	A7 131
So.Chicago,Ill.	R2 127
Sterling,Ill. (1)	N15 131

FENCE POSTS

ChicagoHts.,	Ill. C2 140
Duluth,Minn.	A7 125
Franklin,Pa.	F3 140
Huntington,W.Va.	W7 140
Jonhstown,Pa.	B2 140
Marion,O.	P11 140
Minnequa,Colo.	C10 130
Moline,Ill.	R2 136
So.Chicago,Ill.	R2 140
Tonawanda,N.Y.	B12 140
Williamsport,Pa.	S19 150

TRACK BOLTS (20) Treated

KansasCity,Mo.	S5 9.85
Lebanon,Pa.(31)	B2 9.85
Minnequa,Colo.	C10 9.85
Pittsburgh	O3, P14 9.85
Seattle	B3 10.35

RAILS

	Std. No. 1	Std. No. 2	All No. 2	Std. Toe Rails 60 lb Under
Bessemer,Pa.	U5			
Ensley,Ala.	T2	3.60	3.50	4.00
Fairfield,Ala.	T2	3.60	3.50	4.00
Gary,Ind.	U5			4.00
Huntington,W.Va.	W7	3.60	3.50	3.55 5.00
Ind.Harbor,Ind.	I-2	3.60	3.50	3.55
Johnstown,Pa.	B2			(16)4.00
Lackawanna,N.Y.	B2	3.60	3.50	4.00
Minnequa,Colo.	C10	3.60	3.50	4.50
Steelton,Pa.	B2	3.60	3.50	
Williamsport,Pa.	S19			4.75

TOOL STEEL

Grade	$ per lb
Regular Carbon	0.230
Extra Carbon	0.270
Special Carbon	0.325
Oil Hardening	0.350
5% Cr Hot Work	0.550
Hi-Carbon-Cr	0.635

Grade by Analysis

W	Cr	V	Co	
18	4	1		1.505
18	4	2		1.650
20-25	4.25	1.6	12.25	3.535-3.675
19	4	2	7	2.460
18.25	4.25	1	4.75	2.125
18	4	2	9	2.445-2.45
13.5	4	3		1.6025

W	Cr	V	Mo	
6.4	4.5	1.9	5	0.96-0.965
6	4	3	6	1.190
1.5	4	1	8.5	0.810

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2 and V3.

NAILS & STAPLES, Stock To dealers & mfrs. (7) Col.

AlabamaCity,Ala.	R2 118
Aliquippa,Pa.(13)	J5 118
Atlanta	A11 121
Bartonville,Ill.(19)	K4 118
Chicago,Ill.	W13 118
Cleveland	A9 125
Crawfordsville,Ind.	M8 122
Donora,Pa.	A7 118
Duluth,Minn.	A7 118
Fairfield,Ala.	T2 118
Galveston,Tex.	D7 124
Houston,Tex.	S5 126
Johnstown,Pa.	B2 118
Joliet,Ill.	A7 118
KansasCity,Mo.	S5 130
Kokomo,Ind.	C16 120
Minnequa,Colo.	C10 123
Monessen,Pa.	P7 118
Pittsburg,Calif.	C11 137
Portsmouth,O.	P12 124
Rankin,Pa.	A7 118
So.Chicago,Ill.	R2 118
SparrowsPoint,Md.	B2 120
Sterling,Ill.(1)	N15 118
Torrance,Calif.	C11 138
Worcester,Mass.	A7 124

NAILS, Cut (100 lb keg) To dealers (33)

Conshohocken,Pa.	A3 $7.35
Wheeling,W.Va.	10 7.35

TIE PLATES

Fairfield,Ala.	T2 4.50
Gary,Ind.	U5 4.50
Ind.Harbor,Ind.	I-2 4.50
Lackawanna,N.Y.	B2 4.50
Minnequa,Colo.	C10 4.50
Pittsburg,Calif.	C11 4.65
Seattle	B3 4.65
Steelton,Pa.	B2 4.50
Torrance,Calif.	C11 4.65

JOINT BARS

Bassemer,Pa.	U5 4.70
Fairfield,Ala.	T2 4.70
2nd.Harbor,Ind.	I-2 4.70
Joliet,Ill.	U5 4.70
Lackawanna,N.Y.	B2 4.70
Minnequa,Colo.	C10 4.70
Steelton,Pa.	B2 4.70

STANDARD TRACK SPIKES

Ind.Harbor,Ind.	I-2, Y1 6.15
KansasCity,Mo.	S5 6.40
Lebanon,Pa.	B2 6.15
Minnequa,Colo.	C10 6.15
Pittsburgh	J5 6.15
Seattle	B3 6.65
So.Chicago,Ill.	R2 6.15
Struthers,O.	Y1 6.15
Youngstown	R2 6.15

AXLES

Ind.Harbor,Ind.	S13 5.60
Johnstown,Pa.	B2 5.60

Key to Producers

M1	McLouth Steel Corp.
M4	Mahoning Valley Steel
M5	Medart Co.
M6	Mercer Tube & Mfg. Co.
M8	Mid-States Steel & Wire
M9	Midvale Co.
M12	Moltrup Steel Products
M13	Monarch Steel Co.
M14	McInnes Steel Co.
N2	National Supply Co.
N3	National Tube Div.
N5	Nelsen Steel & Wire Co.
N6	NewEng.-HighCarb. Wire
N8	Newman-Crosby Steel
N12	Niles Rolling Mill Div.
N14	Nrthwst. Steel Roll. Mills
N15	Northwestern S.&W. Co.
N16	New Delphos Mfg. Co.
O3	Oliver Iron & Steel Corp.
O4	Oregon Steel Mills
P1	Pacific States Steel Corp.
P2	Pacific Tube Co.
P4	Phoenix Iron & Steel Co.
P5	Pilgrim Drawn Steel
P6	Pittsburgh Coke & Chem.
P7	Pittsburgh Steel Co.
P9	Pittsburgh Tube Co.
P11	Pollak Steel Co.
P12	Portsmouth Division, Detroit Steel Corp.
P13	Precision Drawn Steel
P14	Pitts. Screw & Bolt Co.
P15	Pittsburgh Metallurgical
P16	Page Steel & Wire Div., Amer. Chain & Cable
P17	Plymouth Steel Co.
R1	Reeves Steel & Mfg. Co.
R2	Republic Steel Corp.
R3	Rhode Island Steel Corp.
R5	Roebling's Sons, John A.
R6	Rome Strip Steel Co.
R7	Rotary Electric Steel Co.
R8	Reliance Div.,Eaton Mfg.
S1	Seneca Wire & Mfg. Co.
S3	Sharon Steel Corp.
S5	Sheffield Steel Corp.
S6	Shenango Furnace Co.
S7	Simmons Co.
S8	Simonds Saw & Steel Co.
S9	Sloss-Sheffield S.&I. Co.
S13	Standard Forgings Corp.
S14	Standard Tube Co.
S15	Stanley Works
S16	Struthers Iron & Steel
S17	Superior Drawn Steel Co.
S18	Superior Steel Corp.
S19	Sweet's Steel Co.
S20	Southern States Steel
T2	Tenn. Coal & Iron Div.
T3	Tenn. Prod. & Chem.
T4	Texas Steel Co.
T5	Thomas Steel Co.
T6	Thompson Wire Co.
T7	Timken Roller Bearing
T9	Tonawanda Iron Div. Am. Rad. & Stan. San.
U1	Ulster Iron Works
U4	Universal Cyclops Steel
U5	United States Steel Co.
V2	Vanadium-Alloys Steel
V3	Vulcan Crucible Steel Co.
W1	Wallace Barnes Co.
W2	Wallingford Steel Co.
W3	Washburn Wire Co.
W4	Washington Steel Corp.
W6	Weirton Steel Co.
W7	W. Va. Steel & Mfg. Co.
W8	West.Auto.Mach.Screw
W9	Wheatland Tube Co.
W10	Wheeling Steel Corp.
W12	Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13	Wilson Steel & Wire Co.
W14	Wisconsin Steel Div. International Harvester
W15	Woodward Iron Co.
W18	Wyckoff Steel Co.
Y1	YoungstownSheet&Tube

Footnotes:

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) Philadelphia del.
(6) Chicago or Birm. base.
(7) To jobbers, 5 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 0.50c for 17 Ga. & heavier.
(14) Also wide flange beams.
(15) ¼" and thinner.
(16) 40 lb and under.
(17) Plate only.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25c off for untreated.
(21) New Haven, Conn. base.
(22) Del. San Francisco Bay area.
(23) 28 Ga. 38" wide.
(24) Deduct 0.20c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing, mill lengths, to fabricators; to consumers, 5.60c.
(27) Bar mill slaw.
(28) Bonderized.
(29) Subject to 10% increase.
(30) Sheared add 0.35c for universal mill.
(31) Not annealed.
(32) Rd. or square edge.
(33) To jobbers, deduct 30c.
(34) 7.25c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 15 gage & lighter; 60" & narrower.
(38) 14 gage & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.039"; 0.035" and heavier, 0.25c higher.

Look in your own backyard!

Vital scrap lies in the oddest places . . . a morning's search can be a needed help.

Scrap is where you find it. Maybe not within the view of your boudoir window. But have you made a real check of your plant premises?

Frankly, all of us suffer from the same inertia and bad habits. We saw the papers and read of the constant cry for steel. We even read ads like these—made an instant promise to do something about it—and with our collective red face—forgot it.

But how about changing all that? How about this very morning—today at the very latest—joining us in a thorough search of the premises . . . and digging out that crumbling pile of iron oxide . . . the stuff you know you never will use in a thousand years . . . and get it on the way to the melting mills.

AT THE FRONTIERS OF PROGRESS YOU'LL FIND AN AIR REDUCTION PRODUCT

Remember SCRAP FOR STEEL TODAY OR A SCRAP FOR LIFE TOMORROW!

AIRCO®

DEALERS AND OFFICES IN PRINCIPAL CITIES

AIR REDUCTION

AIR REDUCTION SALES COMPANY • AIR REDUCTION MAGNOLIA COMPANY • AIR REDUCTION PACIFIC COMPANY

REPRESENTED INTERNATIONALLY BY AIRCO COMPANY INTERNATIONAL

DIVISIONS OF AIR REDUCTION COMPANY, INCORPORATED

STANDARD PIPE, T. & C.

BUTTWELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Black A	Black B	Black C	Galvanized D	Galvanized E	Galvanized F
⅛	5.5c	0.24	34.0	32.0	...	+0.5	+2.5	...
¼	6.0	0.42	28.5	26.5	...	+3.5	+5.5	...
⅜	6.0	0.57	23.5	21.5	...	+10.0	+12.0	...
½	8.5	0.85	36.0	34.0	35.0	12.0	10.0	11.0
¾	11.5	1.18	39.0	37.0	38.0	16.0	14.0	15.0
1	17.0	1.68	41.5	39.5	40.5	19.5	17.5	18.5
1¼	23.0	2.28	42.0	40.0	41.0	20.5	18.5	19.5
1½	27.5	2.78	42.5	40.5	41.5	21.5	19.5	20.5
2	37	3.68	43.0	41.0	42.0	22.0	20.0	21.0
2½	58.5	5.82	43.5	41.5	42.5	23.0	21.0	22.0
3	76.5	7.62	43.5	41.5	42.5	23.0	21.0	22.0

Column A: Etna, Pa. N2 and 36½% on 3½", 4"; Butler, Pa. ⅛-⅜", F6; Benwood, W. Va., 3½ points lower on ⅛", 1½ points lower on ¼", and 2 points lower on ⅜", W10; Sharon, Pa. M6, 1 point higher on ⅛", 2 points lower on ¼" and ⅜", Wheatland, Pa. W9, 2 points lower on ⅛", ¼", ⅜"; Following make ½" and larger: Lorain, O., N3; Youngstown R2 and 36¼% on 3½" and 4"; Youngstown Y1, Aliquippa, Pa. J5; Fontana, Calif. K1 quotes 11½ points lower on ½" and larger continuous weld and 24% on 3½" and 4".

Columns B & E: Sparrows Point, Md. B2

Columns C & F: Indiana Harbor, Ind., Y1; Alton, Ill., (Gary base) 2 points lower discount L1.

Column D: Butler, Pa. F6, ⅛-⅜"; Benwood, W. Va. W10, except plus 4% on ⅛", plus 6% on ¼", plus 13% on ⅜" and 15.5% on 3½", 4"; Sharon, Pa. M6, plus 2.5 on ⅛", 1 point lower on ½", ¾", 1½ points lower on 1" and 1¼", 2 points lower on 1½", 2", 2½" and 3". Wheatland, Pa. W9, add 2 points on ⅛", ¼", ⅜", 1 point lower on ½", 2 points lower on 1", 1½", 2", 1½ points lower on 1¼", 2½", 3". Etna, Pa. N2 and 15.5% on 3½", 4". Following quote only on ½" and larger: Lorain, O. N3; Youngstown R2, and 15½% on 3½" and 4"; Youngstown Y1, Aliquippa, Pa. J5 quotes 1 point lower on ⅜", 2 points lower on 1", 1½", 2", 1½ points lower on 1¼", 2½" and 3"

SEAMLESS AND ELECTRIC WELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Seamless Black A	Seamless Galv. B	Elec. Weld Black C	Elec. Weld Galv. D
2	37.0c	3.68	29.5	8.0	29.5	8.0
2½	58.5	5.82	32.5	11.5	32.5	11.5
3	76.5	7.62	32.5	11.5	32.5	11.5
3½	92.0	9.20	34.5	13.5	34.5	13.5
4	$1.09	10.80	34.5	13.5	34.5	13.5
5	1.48	14.81	37.0	16.0	37.0	16.0
6	1.92	19.18	37.0	16.0	37.0	16.0

Column A: Aliquippa J5; Ambridge N2; Lorain N3; Youngstown Y1.

Column B: Aliquippa J5 quotes 1½ pts lower on 2", 1 pt lower on 2½-6 in.; Lorain N3; Youngstown Y1.

Columns C & D: Youngstown R2.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
1	13	13.45	16.47	15.36	15.36
1¼	13	16.09	19.71	15.61	18.19
1½	13	17.27	21.15	17.25	20.30
1¾	13	19.29	23.62	19.62	23.09
2	13	21.62	26.48	21.99	25.84
2¼	13	24.35	29.82	24.50	28.84
2½	12	26.92	32.97	26.98	31.76
2½	12	29.65	36.32	29.57	34.76
2¾	12	32.11	39.33	31.33	36.84
3	12	34.00	41.64	32.89	38.70

CLAD STEELS

(Cents per pound)

Cladding Stainless	Plates— Carbon Base 10%	Plates— Carbon Base 20%	Strip— Cold-Rolled Carbon Base Both Sides	Sheets— Carbon Base 10%	Sheets— Carbon Base 20%	Sheets— Cu Base Both Sides
302	...	...	...	19.75 *	26.24 ‡ 27.50	77.00
304	25.00	29.50	...	24.50	27.50 ‡ 27.77	77.00
309	30.50	35.00	...	...	...	...
310	36.50	41.00	...	...	...	144.00
316	29.50	34.00	...	26.00	35.92 ‡ 36.50	...
317	34.50	39.00	...	...	...	...
318	33.50	38.00	...	...	...	...
321	26.50	31.00 ‡ 32.00	...	23.00	33.00 ‡ 33.83	111.00
347	27.50	32.00	...	24.00	33.50 ‡ 33.83	130.00
405	21.25	27.75	...	...	...	...
410	20.75	27.25	...	...	...	...
Nickel	33.55	45.15	41.00	54.00	...	...
Inconel	41.23	54.18	...	...	...	165.00
Monel	34.93	46.28	...	...	...	...
Copper*	...	...	23.70†	29.65‡	...	...

* Deoxidized. † 20.20c for hot-rolled. ‡ 26.40c for hot-rolled. Production points for carbon base products: Stainless plates, sheet, Conshohocken, Pa. A3 and New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; nickel, copper-clad strip, Carnegie, Pa. S18. Production point for copper-base sheets is Carnegie, Pa. A13.

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants, per cent off list for less than case lots to consumers)

6 in. and shorter:

½-in. & smaller diam.	15
⅝-in. & ¾-in.	18.5
⅞-in. and larger	17.5

Longer than 6 in.:

All diams.	14
Lag bolts, all diams.	23
6 in. and shorter over 6 in. long	21
Ribbed Necked Carriage	18.5
Blank	34
Plow	34
Step, Elevator, Tap and Sleigh Shoe	21
Tire bolts	12
Boiler & Fitting-Up Bolts	31

NUTS

H.P. & C.P. Square:	Reg. Hvy.
½-in. & smaller	15 15
⅝-in. & ¾-in.	12 6.5
⅞-in.-1⅛-in.	9 1
1⅛-in. & larger	7.5 1
H.P. Hex.:	
½-in. & smaller	26 22
⅝-in. & ¾-in.	16.5 6.5
⅞-in.-1½-in.	12 2
1⅝-in. & larger	8.5 2
C.P. Hex.:	
½-in. & smaller	26 22
⅝-in. & ¾-in.	23 17.5
⅞-in. & 1½-in.	19.5 12
1⅝-in. & larger	12 6.5

SEMIFINISHED NUTS

American Standard

(Per cent off list for less than case of keg quantities)

	Reg.	Hvy.
½-in. & smaller	35	28.5
⅝-in. & ¾-in.	29.5	22
⅞-in.-1½-in.	24	15
1⅝-in. & larger	13	8.5
⅜-in. & smaller	...	Light 35
½-in. to ¾-in.	...	28.5
⅞-in. to 1½-in.	...	26

STEEL STOVE BOLTS

(F.o.b. plant; per cent off list in packages)

Plain finish	48-4& 10
Plated finishes	31 & 10

HEXAGON CAP SCREWS

(1020 steel packaged; per cent off list)

6 in. or shorter:

¼-in. & smaller	42
⅜-in. through 1 in.	34

Longer than 6 in.:

¼-in. & smaller	26
⅜-in. through 1 in.	4

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam. x 6 in. and shorter 38

1 in. and smaller diam. x over 6 in. 26

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller	35
¼-in. diam. & larger	16
N.F. thread, all diams.	10

RIVETS

F.o.b. midwestern plants

Structural ½-in. larger 7.85c

⅞-in. under ... 26 off

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers. List to list-plus-$1.

FLUORSPAR

Metallurgical grade, f. o. b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70%, $43; 60%, $40.

Imported, net ton, duty paid, metallurgical grade, $33-$35.

ELECTRODES

(Threaded, with nipples, unboxed, f.o.b. plant)

GRAPHITE

Inches Diam.	Length	Cents per lb
17.18, 20	60, 72	17.85
8 to 16	48, 60, 72	17.85
7	48, 60	19.57
6	48, 60	20.95

CARBON

35, 40	110	8.03
30	63, 84, 110	8.03
24	72 to 104	8.03
17 to 20	34, 60	8.03

STAINLESS STEEL

Type	Sheets	C.R. Strip	Bars Wire Structurals
301	41.00	34.00	31.25
302	41.25	34.75	31.50
303	43.25	40.25	34.00
304	43.25	38.75	33.00
309	56.00	55.00	44.75
316	57.00	59.00	49.25
321	49.25	48.25	37.00
347	53.75	52.25	41.50
410	36.50	30.50	25.75
416	37.00	37.00	26.25
420	44.00	47.00	31.25
430	39.00	31.00	26.25
501	27.50	26.00	14.25
502	28.50	27.00	15.25

Bait. Types 301-347 sheet, except 303 and 309 E2.

Brackenridge, Pa., Sheets A4 quotes slight variations on Types 301-347.

Bridgeville, Pa., bars, wire, sheets & strip U4.

Butler, Pa., sheets and strip except Types 303, 309, 416, 420, 501 & 502, A10.

Carnegie, Pa., sheets and strip except Types 303, 416, 501 & 502 and 0.25c lower on Types 302, 304, 321, 347; 0.50c lower on Types 309 and 316 S18.

Cleveland, strip A7.

Detroit, strip M1 quotes 34.00c on Type 301; 36.50c, 302; 38.50c, 304; 58.50c, 316; 52.00c, 347; 30.50c, 410; 31.00c, 430.

Dunkirk, N. Y., bars, wire A4 quotes slight variations on Types 301-347.

Duquesne, Pa., bars U5.

Fort Wayne, Ind., bars and wire, except Types 501 & 502 J6 quotes slight variations on Types 301-347.

Gary, Ind., sheets except Type 416 U5.

Harrison, N. J., strip and wire C18.

Massillon, O., all items, R2

McKeesport, Pa., strip, Type 410; bars & wire, Types 410 through 430 and 31.25c on Type 302, 33.75c on 303, 32.75c on 304, 48.75c on 316, 36.75c on 321, 41.25c on 347 F2.

McKeesport Pa. bars sheets except Type 416 U5.

Middletown, O., sheets and strip except Types 303, 416, 420, 501 and 502 A10

Midland, sheets & strip C18.

Munhall, Pa., bars U5.

Pittsburgh, sheets C18.

Reading, Pa., strip except 34.25c on Type 301 and 36.00c on 309; bars except 31.50c on Type 301 and 45.25c on 309 C4.

Sharon, Pa., strip, except Types 303, 309, 416, 501, 502 and 34.25c on Type 301 S3.

So. Chicago, Ill., bars & structurals U5.

Syracuse, N. Y., bars, wire & structurals C18.

Titusville, Pa., bars, U4.

Wallingford, Conn., strip W2 quotes 0.25c higher.

Washington, Pa., bars, sheets & strip, except 0.25c higher on Type 301 J3.

Washington, Pa., Types 301 through 347 sheets & strip except 303, 309, 316 sheets 62.00c, strip 64.00c W4.

Watervliet, N. Y., structurals & bars A4 quotes variations on Types 301-347.

Waukegan, bars & wire A7.

West Leechburg, Pa., strip, A4 quotes slight variations on Types 301-347.

Youngstown, strip except Types 303, 309, 316, 416, 501 and 502 and 34.25c on Type 301.

COAL CHEMICALS

Spot, cents per gallon, ovens	
Pure, benzol	30.00-35.00
Toluol, one deg.	26.00-33.00
Industrial xylol	25.00-33.50

Per ton bulk, ovens

Sulphate of ammonia	$32-$45
Cents per pound, ovens	
Phenol: 40 (carlots, non-returnable drums)	17.25

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted.)

	Cents
Sponge iron	
98+% Fe, carlots	17.00
Swedish, c.i.f. New York in bags	8.85-9.95
Electrolytic Iron:	
Annealed, 99.5% Fe	42.50
Unannealed, 99 + % Fe	36.50
Unannealed, 99 + % Fe (minus 325 mesh)	58.50
Powder Flakes	48.50
Carbonyl Iron:	
97.9-99.8%, size 5 to 10 microns	$3.00-148.00
Aluminum:	
Carlots, freight allowed	29.50
Atomized, 500 lb drums, freight allowed	33.50
Antimony	75.85
Brass, 10-ton lots	30.00-33.25
Bronze, 10-ton lots	51.25-60.00
Phosphor-Copper, 10 ton lots	50.00
Copper:	
Electrolytic	37.25-46.25
Reduced	33.75-37.00
Lead	25.50
Magnesium	75.00-85.00
Manganese:	
Minus 100-mesh	57.00
Minus 35 mesh	52.00
Minus 200 mesh	62.00
Nickel, unannealed	86.00
Nickel-Silver 10-ton lots	45.00
Silicon	38.50
Solder (plus cost of metal)	8.50
Stainless Steel, 302	83.00
Zinc, 10-ton lots	23.00-30.50
Tungsten	Dollars
Melting grade, 99%, 60 to 200 mesh, freight allowed:	
1000 lb and over	6.00
Less than 1000 lb	6.15
98.8%, minus 65 mesh, freight allowed:	
1000 lb and over	4.15
Less than 1000 lb	4.25
Molybdenum:	
99.9%, minus 200 mesh	3.25
Chromium, electrolytic 99% Cr min.	3.50

METALLURGICAL COKE

Price per net ton

BEEHIVE OVENS

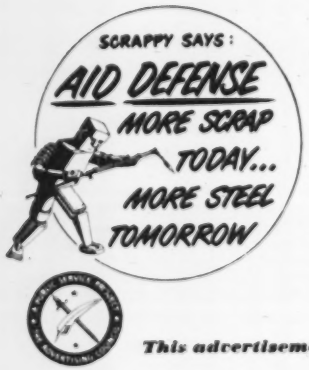
Connellsvill fur.	$14.50-15.00
Connelsvil fdy	17.00-18.00
New River foundry	21.30
Wise county foundry	15.95
Wise county, furnace	15.20

OVEN FOUNDRY COKE

Kearny, N. J., ovens	$22.75
Everett, Mass., ovens	
New England del.	*24.80
Chicago ovens	23.00
Chicago, del.	24.50
Terre Haute, ovens	22.50
Milwaukee, ovens	23.75
Indianapolis, ovens	22.75
Chicago, del.	26.42
Cincinnati, del.	25.85
Detroit, del.	26.85
Ironton, O., ovens	22.50
Cincinnati, del.	25.12
Painesville, O., ovens	24.00
Cleveland, del.	25.82
Erie, Pa., ovens	23.50
Birmingham, ovens	20.30
Birmingham, del.	21.60
Philadelphia, ovens	22.70
Neville Island Pa., ovens	23.00
Swedeland, Pa., ovens	22.60
St. Louis, ovens	
St. Louis, del.	25.40
Portsmouth, O., ovens	22.50
Cincinnati, del.	25.12
Detroit, ovens	24.00
Detroit, del.	25.00
Buffalo, del.	26.89
Flint, del.	26.59
Pontiac, del.	25.47
Saginaw, del.	26.92

* Or within $4.15 freight zone from works.

Part of the Mesabi Range may be **wasting away** in your plant



Natural resources don't last forever . . . not even the Mesabi Range.

But *you* can make them last *longer* . . . by helping to recover the *dormant* iron and steel wasting away in your plant.

Right now, more iron and steel *scrap* is needed than ever before to help maintain steel production. Lack of enough scrap—which normally represents 50% of the ingredients used in making new steel—would seriously hamper the nation in this critical period.

WHAT *YOU* CAN DO

To meet demands of military and civilian production, *your* help is needed. That means searching *your* plant for *more* scrap . . . any old idle iron and steel gathering dust and rust.

Your scrap is needed *now*.

Get *your* scrap salvage program going—*today*. Include non-ferrous scrap, too.

It tells how to conduct your own salvage program

For your copy, write to Advertising Council, 25 West 45 Street, New York 19, New York

This advertisement is a contribution, in the national interest, by

STEEL

The Weekly Magazine of Metalworking

WAREHOUSE STEEL PRODUCTS

(Representative prices, cents per pound, for delivery within switching limits, subject to extras.)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga., Heavier*	C.R.	Galv. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140§		Carbon	Floor
New York (city)	6.54	7.21	8.55	7.05	...	6.62	7.53	9.28	6.37	6.71	7.98
JerseyCity(c'try)	6.24	6.91	8.25	6.75	...	6.32	7.23	8.98	6.07	6.41	7.68
Boston (city)	6.40	7.18	8.63	6.35	...	6.25	7.04	9.00	6.40	6.86	7.84
Boston (c'try)	6.20	6.98	8.43	6.15	...	6.05	6.84	9.20	6.20	6.66	7.64
Phila. (city)	6.97	7.05	8.38	6.33	7.11	6.30	7.16	8.92	6.13	6.34	7.40
Phila. (c'try)	6.72	6.80	8.13	6.08	6.86	6.05	6.91	8.67	5.88	6.09	7.15
Balt. (city)	6.22	7.00	8.40	6.23	...	6.21	6.83	...	6.33	6.33	7.57
Balt. (c'try)	6.02	6.80	8.20	6.03	...	6.01	6.63	...	6.13	6.13	7.37
Norfolk, Va.	6.78	...	...	...	...	6.00	7.20	...	6.30	6.30	7.13
Richmond, Va.	5.95	6.57	8.10	6.14	...	5.91	6.59	...	6.22	6.56	7.47
Wash. (w'hse).	6.02	7.26	8.49	6.46	...	6.46	7.26	...	6.56	6.22	7.86
Buffalo (del.).	5.80	6.60	8.29	6.06	...	5.80	6.65	10.65††‖	6.00	6.25	7.55
Buffalo (w'hse)	5.60	6.40	8.09	5.86	...	5.60	6.45	10.45††‖	5.80	6.05	7.35
Pitts. (w'hse).	5.50	6.32	7.85	5.59	6.90	5.45	6.20	10.30††	5.65	5.65	6.89
Detroit (w'hse).	5.75	6.47	8.12	5.76	7.15	5.76	6.64	9.13	6.09	5.88	7.21
Cleveland (del.)	5.74	6.52	8.16	5.85	7.18	5.82	6.60	8.91	6.15	6.15	7.39
Cleve. (w'hse).	5.54	6.32	7.96	5.65	6.98	5.62	6.40	8.71	5.95	5.95	7.19
Cincin. (city)	5.99**	6.53	8.44	6.15	...	5.90	6.79	...	6.24	6.29	7.43
Chicago (city)	5.76	6.55	8.08	5.77	...	5.67	6.50	10.50††	5.88	5.90	7.09
Chicago (w'hse)	5.56	6.35	7.88	5.57	...	5.47	6.30	10.30††	5.68	5.70	6.89
Milwau. (city)	5.90	6.76	8.21	5.85	...	5.83	6.76	10.85††	6.01	6.06	7.25
Milwau. (c'try)	5.70	6.56	8.01	5.65	...	5.63	6.56	10.65††	5.81	5.86	7.05
St. Louis (del.)	6.05	6.85	8.20	6.00	...	6.00	6.85	10.55	6.23	6.33	7.53
St. L. (w'hse).	5.85	6.65	8.00	5.80	...	5.80	6.65	10.35	6.03	6.13	7.33
Kans. City(city)	6.40	7.20	8.40	6.35	...	6.35	7.20	...	6.50	6.60	7.80
KansCity(w'hse)	6.20	7.00	8.20	6.15	...	6.15	7.00	...	6.30	6.40	7.60
Birm'hm (city).	5.75	6.55	6.90‡	5.70	...	5.70	7.53	...	5.85	6.10	8.25
Birm'hm(w'hse)	5.60	6.40	6.75‡	5.55	...	5.55	7.53	...	5.70	5.95	8.23
Los Ang. (city)	6.55	8.10	9.05‡	6.60	8.90	6.55	7.75	...	6.55	6.60	9.20
L. A. (w'hse).	6.35	7.90	8.85‡	6.40	8.70	6.35	7.55	...	6.35	6.40	8.70
Seattle-Tacoma.	7.04	8.64	9.25	7.04	...	6.70	8.80	10.35	6.54	6.78	8.73
San Francisco.	6.62	7.88‡	9.10‡	6.60	...	6.45	8.20	11.15	6.45	6.37	8.33

* Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); ‡ includes extra for 10 gage; § as rolled; ** 16 gage; †† as annealed; ‖ 15 gage. Base quantities, 2000 to 9999 lb except as noted: Cod-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; 2—500 to 1499 lbs; 4—450 to 1499 lb; 5—3500 lb and over; 8—1000 to 1999 lb.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (natural), lower lake ports.

After adjustment for analysis, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in applicable lake vessel rates, upper lake rail, freights, dock handling charges and taxes thereon.

Old range bessemer	$8.70
Old range nonbessemer	8.55
Mesabi bessemer	8.45
Mesabi nonbessemer	8.30
High phosphorus	8.30

Eastern Local Ore

Cents per unit del., E. Pa.

Foundry and basic 56-62% concentrates contract	17.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot	17.00
Long-term contract	15.00
North African hematites	17.00
Brazilian iron ore, 68-69%	24.00-25.00

Tungsten Ore

Net ton unit, duty paid

Foreign wolframite and scheelite, per net ton unit	$65.00
Domestic scheelite mines	65.00

Manganese Ore

Manganese, 48% nearby, $1.18-$1.22 per long ton unit, c.i.f., U. S. ports, duty for buyer's account; shipments against old contracts for 48% ore are being received from some sources at 79.8-81.6c.

Chrome Ore

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African	
48% 2.8:1	$32.50
48% 3:1	35.00-36.00
48% no ratio	26.00
South African Transvaal	
44% no ratio	$27.00-28.00
48% no ratio	34.00-35.00
Brazilian	
44% 2.5:1 lump	$32.00
Rhodesian	
45% no ratio	$20.00-21.00
48% no ratio	26.00
48% 3:1 lump	35.00-36.00
Domestic—rail nearest seller	
48% 3:1	$39.00

Molybdenum

Sulphide concentrates per lb., molybdenum content, mines	$1.00

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 21.75c per lb of contained Cr, c.l., packed 22.65c, ton lot 23.50c, less ton 25.20c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%.) Contract, carload, lump, bulk, max 0.03% C 33.60c per lb of contained Cr, 0.04% C 31.50c, 0.06% C 30.50c, 0.10% C 30.00c, 0.15% C 29.75c, 0.20% C 29.50c, 0.50% C 29.25c, 1% C 29.00c, 1.50% C 28.85c, 2% C 28.75c. Carload, packed add 1.1c, ton lot add 2.2c, less ton add 3.4c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High Carbon: (Cr 62-66%, C 5-7%). Contract, c.l. S M x D, bulk, 23.25c per lb of contained Cr. C.l., packed 24.15c, ton 25.50c, less ton 27.25c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max.) Contract, carload, packed, S M x D, 16.35c per lb of alloy; ton lot 17.2c; less ton lot, 18.4c, delivered; spot, add 0.25c.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max.) Contract, carload, lump, 4" x down and 2" x down, bulk, 21.75c per lb of contained chromium plus 12.4c per pound of contained silicon; 1" x down, bulk 21.90c per pound of contained chromium plus 12.60c per pound of contained silicon. F.o.b. plant; freight allowed to destination.

Ferrochrome Silicon, No. 2: (Cr 36-39%, Si 26-29%, Al 7-9%, C 0.05% max.) 21.75c per lb of contained silicon plus aluminum 3" x down, delivered.

Chromium Metal: (Min. 97% Cr and 1% Fe) Contract carload, 1" x D; packed, max 0.50% C grade, $1.08 per lb of contained chromium ton lot $1.10, less ton $1.12. Delivered. Spot add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.00c per lb of contained Si; packed 21.40c; ton lot 22.50c, f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 12.40c per lb of contained Si, carload packed 14.0c, ton lot 15.45c, less ton 17.1c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 14.3c per lb of contained Si, carload packed 15.6c, ton lot 16.75c, less ton 18.0c. Delivered. Spot, add 0.8c.

Note: Current prices on zirconium, calcium and briquetted alloys appeared on page 109, Jan. 21 issue; manganese, titanium and "other" ferroalloys, page 103, Jan. 28. Refractories prices were published on page 109, Jan. 21.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.) Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 17.5c per lb of contained Si, carload packed 18.7c, ton lot 19.65c, less ton 20.7c. Delivered. Spot, add 0.25c.

Silicon Metal: (Min. 97% Si and 1% max. Fe). C.l. lump, bulk, regular 20.0c per lb of Si, c.l. packed 21.2c, ton lot 22.1c, less ton 23.1c. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe.) Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.90c per lb of alloy, ton lots packed 11.30c, 200 to 1999 lb 11.65c, smaller lots 12.15c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V35-55%, Si 8-12% max., C 3-3.5% max.). Contract, any quantity, $3.10 per lb of contained V. Delivered. Spot, add 10c. **Crucible-Special Grades** (V 35-55%, Si 2-3.5% max., C 0.5-1% max.), $3.20. **Primos and High Speed Grades** (V 35-55%, Si 1.50% max., C 0.20% max.) $3.30.

Grainal: Vanadium Grainal No. 1, $1 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.28 per lb contained V_2O_5, freight allowed. Spot, add 5c.

BORON ALLOYS

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Contract, 100 lb or more, 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 75c per pound; Grade B (14-18% B) $1.20; Grade C (19% min. B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%) contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

TUNGSTEN ALLOYS*

Ferrotungsten: (70-80%), 10,000 lb W or more, $5.00 per lb of contained W; 20,000 lb W to 10,000 lb W, $5.10; less than 2000 lb W, $5.22.

Tungsten Powder: Carbon Reduced; (W 98.8% min.) 1000 lb or more, $6.00 per lb of contained W; less than 1000 lb W, $6.15.

*Government ceiling prices, effective May 7, 1951, f.o.b. Niagara Falls, N. Y., basis.

CEILING PRICES, IRON AND STEEL SCRAP

Prices as set forth in Office of Price Stabilization ceiling price regulation No. 5, as amended Oct. 23, 1951

STEELMAKING SCRAP COMPOSITE

Jan. 31	$43.00
Jan. 24	43.00
Dec. 1951	43.00
Jan. 1951	46.33
Jan. 1947	31.20

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

Basing point ceiling prices per gross ton from which maximum shipping prices are computed on scrap of dealer and industrial origin, and from which ceiling on-line and ceiling delivered prices are computed on scrap of railroad origin.

Grade 1 Basing Point	No. 1 Bundles Dealer, Industrial	No. 1 Heavy Melt Railroad
Alabama City, Ala.	$39.00	$41.00
Ashland, Ky.	42.00	44.00
Atlanta, Ga.	39.00	41.00
Bethlehem, Pa.	42.00	44.00
Birmingham, Ala.	39.00	41.00
Brackenridge, Pa.	44.00	46.00
Buffalo, N. Y.	43.00	45.00
Butler, Pa.	44.00	46.00
Canton, O.	44.00	46.00
Chicago, Ill.	42.50	44.50
Cincinnati, O.	43.00	45.00
Claymont, Del.	42.50	44.50
Cleveland, O.	43.00	45.00
Coatesville, Pa.	42.50	44.50
Conshohocken, Pa.	42.50	44.50
Detroit, Mich.	41.15	43.15
Duluth, Minn.	40.00	42.00
Harrisburg, Pa.	42.50	44.50
Houston, Tex.	37.00	39.00
Johnstown, Pa.	44.00	46.00
Kansas City, Mo.	39.50	41.50
Kokomo, Ind.	42.00	44.00
Los Angeles	35.00	37.00
Middletown, O.	43.00	45.00
Midland, Pa.	44.00	46.00
Minnequa, Colo.	38.00	40.00
Monessen, Pa.	44.00	46.00
Phoenixville, Pa.	42.50	44.50
Pittsburg, Calif.	35.00	37.00
Pittsburgh, Pa.	44.00	46.00
Portland, Oreg.	35.00	37.00
Portsmouth, O.	42.00	44.00
St. Louis, Mo.	41.00	43.00
San Francisco	35.00	37.00
Seattle, Wash.	35.00	37.00
Sharon, Pa.	44.00	46.00
Sparrows Pt., Md.	42.00	44.00
Steubenville, O.	44.00	46.00
Warren, O.	44.00	46.00
Weirton, W. Va.	44.00	46.00
Youngstown, O.	44.00	46.00

Differentials from Base

Differentials per gross ton for other grades of dealer and industrial scrap:

O-H and Blast Furnace Grades	
2. No. 1 Busheling	Base
3. No. 1 Heavy Melting	—$1.00
4. No. 2 Heavy Melting	— 1.00
5. No. 2 Bundles	— 1.00
6. Machine Shop Turnings	—10.00
7. Mixed Boring & Short Turnings	— 6.00
8. Shoveling Turnings	— 6.00
9. No. 2 Busheling	— 4.00
10. Cast Iron Borings	— 6.00
Elec. Furnace and Fdry. Grades	
11. Billet, Bloom & Forge Crops	+ 7.50
12. Bar Crops & Plate	+ 5.00
13. Cast Steel	+ 5.00
14. Punchings & Plate Scrap	+ 2.50
15. Electric Furnace Bundles	+ 2.00
Cut Structurals & Plate:	
16. 3 feet and under	+ 3.00
17. 2 feet and under	+ 5.00
18. 1 foot and under	+ 6.00
19. Briquetted Cast Iron Borings	Base
Foundry, Steel:	
20. 2 feet and under	Base
21. 1 foot and under	+ 3.00
22. Springs and Crankshafts	+ 1.00
23. Alloy Free Turnings	— 3.00
24. Heavy Turnings	— 1.00
25. Briquetted Turnings	Base
26. No. 1 Chemical Borings	— 3.00
27. No. 2 Chemical Borings	— 4.00
28. Wrought Iron	+10.00
29. Shafting	+10.00
30. Hard Steel cut 2 ft & under	+ 3.00
31. Old Tin & Terne Plated Bundles	—10.00

Unprepared Grades

When compressed constitutes:

32. No. 1 Bundles	— 6.00
33. No. 2 Bundles	— 9.00
34. Other than material suitable for hydraulic compression	— 8.00

Restrictions on Use

(1) Prices for Grades 11 and 23 may be charged only when shipped to a consumer directly from an industrial producer; otherwise ceiling prices shall not exceed prices established for Grades 12 and 8, respectively.

(2) Prices established for Grades 26 and 27 may be charged only when sold for use for chemical or annealing purposes, and in the case of Grade 27, for briquetting and direct charge into an electric furnace; otherwise ceiling prices shall not exceed price established for Grade 10.

(3) Prices established for Grade 28 may be charged only when sold to a producer of wrought iron; otherwise ceiling price shall not exceed ceiling price for corresponding grade of basic open-hearth.

(4) Premiums for Grades 11-18, 20 and 21 may be charged only upon OPS authorization or when sold for use in electric and open-hearth furnaces or foundries.

(5) Prices for Grade 29 may be charged only when sold for forging or rerolling purpose.

(6) Prices for Grade 30 may be charged only when sold upon OPS authorization to a gray iron foundry; otherwise price for Grade 20 will prevail.

Special Pricing Provisions

(1) Sellers of Grades 26 and 27 may make an extra charge of $1.50 per ton for loading in box cars, or 75 cents per ton for covering gondola cars with a weather-resistant covering.

(2) Ceiling price of pit scrap, ladle scrap, salamander scrap, skulls, skimmings or scrap recovered from slag dumps and prepared to charging box size, shall be computed by deducting from the price of No. 1 heavy melting steel of dealer and industrial origin, the following amounts: Where iron content is 85% and over, $6; 75% and over, $10; less than 75%, $12.

(3) Ceiling price of any inferior grade of scrap not listed shall not exceed the price of No. 1 bundles less $15.00.

Differentials from Base

Differentials per gross ton above or below the price of Grade 1 (No. 1 railroad heavy melting steel) for other grades of railroad steel scrap:

2. No. 2 Heavy Melting Steel	—$2.00
3. No. 2 Steel Wheel	Base
4. Hollow Bored Axles and loco. axles with keyways between the wheelseats	Base
5. No. 1 Busheling	— 3.50
6. No. 1 Turnings	— 3.00
7. No. 2 Turnings, Drillings & Borings	—12.00
8. No. 2 Cast Steel and uncut wheelcenters	— 6.00
9. Uncut Frogs, Switches	Base
10. Flues, Tubes & Pipes	— 8.00
11. Structural, Wrought Iron and/or steel, uncut	— 6.00
12. Destroyed Steel Cars	— 8.00
13. No. 1 Sheet Scrap	— 9.50
14. Scrap Rails, Random Lengths	+ 2.00
15. Rerolling Rails	+ 7.00
Cut Rails:	
16. 3 feet and under	+ 5.00
17. 2 feet and under	+ 6.00
18. 18 inches and under	+ 8.00
19. Cast Steel, No. 1	+ 3.00
20. Uncut Tires	+ 2.00
21. Cut Tires	+ 5.00
Bolsters & Side Frames:	
22. Uncut	Base
23. Cut	+ 3.00
24. Angles, Splice Bars & Tie Plates	+ 5.00
25. Solid Steel Axles	+ 12.00
26. Steel Wheels, No. 3 oversize	Base
27. Steel Wheels, No. 3	+ 5.00
28. Spring Steel	+ 5.00
29. Couplers & Knuckles	+ 5.00
30. Wrought Iron	+ 8.00
31. Fireboxes	— 8.00
32. Boilers	— 6.00
33. No. 2 Sheet Scrap	—13.00
34. Carsides, Doors, Car Ends, cut apart	— 6.00
35. Unassorted Iron & Steel	— 6.00
36. Unprepared scrap, not suitable for hydraulic compression	— 8.00

Restrictions on Use

(1) Price established for Grade 15 may be charged only when purchased and sold for rerolling uses, otherwise, ceiling shall not exceed that for Grade 14.

(2) Price established for Grade 30 may be charged only when sold to a producer of wrought iron; otherwise ceiling shall not exceed that for No. 1 heavy melting steel.

(3) Price, Grade 25 may be charged only when sold for rerolling and forging purposes; otherwise ceiling shall not exceed that for base grade (No. 1).

CAST IRON SCRAP

Ceiling price per gross ton for following grades shall be f.o.b. shipping point:

Cast Iron:

1. No. 1 (Cupola)	$49.00
2. No. 2 (Charging Box)	47.00
3. No. 3 (Hvy. Breakable)	45.00
4. No. 4 (Burnt Cast)	41.00
5. Cast Iron Brake Shoes	41.00
6. Stove Plate	46.00
7. Clean Auto Cast	52.00
8. Unstripped Motor Blocks	43.00
9. Cupola No. 1	47.00
10. Malleable	55.00
11. Drop Broken Machinery	52.00

Restrictions on Use

(1) Ceiling shipping point price which a basic open-hearth consumer may pay for No. 1 cast iron, clean auto cast, malleable or drop broken machinery cast shall be ceiling price for No. 2 charging box cast.

(2) Ceiling shipping point price which any foundry other than a malleable iron producer may pay for Grade 10 shall be ceiling price for No. 1 cast iron.

Preparation Charges

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of dealer or industrial origin authorized by OPS are:

(1) For preparing into Grade No. 3, No. 4 or No. 2, $8.

(2) For hydraulically compressing Grade No. 1, $6 per ton; Grade No. 5, $8.

(3) For crushing Grade No. 6, $3.

(4) For preparing into: Grade No. 26, $6.

(5) Grade No. 19, $6.

(6) Grades No. 12, No. 13, No. 14, No. 16, or No. 20, $10.

(7) Grade No. 17 or No. 21, $11.

(8) Grade No. 18, $12.

(9) For hydraulically compressing Grade No. 15, $8.

(10) For preparing into Grade No. 28, $10.

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of railroad origin shall be:

(1) For preparing into Grade No. 1 and Grade No. 2, $8.

(2) For hydraulically compressing Grade No. 13, $6.

For preparing into:

(3) Grade No. 16, $4.

(4) Grade No. 17, $5.

(5) Grade No. 18, $7.

(6) Grade No. 21, $4.

(7) Grade No. 23, $4.

Ceiling fees per gross ton which may be charged for intransit preparation of cast iron are limited to:

(1) For preparing Grade No. 8 into grade No. 7, $9.

(2) For preparing Grade No. 3 into Grade No. 11, $7.

(3) For preparing Grade No. 3 into Grade No. 1, $4.

Whenever scrap has arrived at its point of delivery and consumer engages a dealer to prepare such scrap, no fee may be charged for such services unless consumer obtains prior written OPS approval.

Commissions

No commission shall be payable to a broker in excess of $1.

Premiums for Alloy Content

No premium may be charged for alloy content except: $1.25 per ton for each 0.25% of nickel where scrap contains not less than 1% and not over 5.25% nickel; $2 per ton for scrap containing not less than 0.15 per cent molybdenum and $3 for scrap containing not less than 0.65% molybdenum; for scrap containing not less than 10% manganese, $4 for scrap in sizes larger than 12 x 24 x 8 in.; and $14 for scrap cut in that size or smaller (applicable only if scrap is sold for electric furnace uses or on NPA allocation); $1 for scrap conforming to SAE 52100.

Switching Charges

Switching charges to be deducted from basing point prices of dealer, industrial and nonoperating railroad scrap, to determine ceiling shipping point prices for scrap originating in basing points are per gross ton:

Alabama City, Ala., 43c; Ashland, Ky., 47c; Atlanta, 51c; Bethlehem, Pa., 52c; Birmingham, 50c; Brackenridge, Pa., 53c; Buffalo, 83c; Butler, Pa., 65c; Canton, O., 51c; Chicago (including Gary, Ind.), $1.34; Cincinnati (including Newport, Ky.), 65c; Claymont, Del. (including Chester, Pa.), 79c; Cleveland, 76c; Coatesville, Pa., 50c; Conshohocken, Pa., 20c; Detroit, 95c; Duluth, Minn., 50c; Harrisburg, Pa., 51c; Houston, 57c; Johnstown, Pa., 76c; Kansas City, Mo., 78c; Kokomo, Ind., 51c; Middletown, O., 26c; Midland, Pa., 75c; Minnequa, Colo., 33c; Monessen, Pa., 51c; Phoenixville, Pa., 51c; Pittsburg, Calif., 65c; Pittsburgh (including Bessemer, Homestead, Duquesne, Munhall), 99c; Portland, Oreg., 52c; Portsmouth, O., 51c; St. Louis (including Federal, Granite City, E. St. Louis, Madison, Ill.), 51c; San Francisco (including So. San Francisco, Niles, Oakland), 66c; Seattle, 56c; Sharon, Pa., 75c; Sparrows Point, Md., 20c; Steubenville, O., 51c; Warren, Pa., 75c; Weirton, 70c; Youngstown, 75c.

HAMILTON, ONT.

(Delivered Prices)

Heavy Melt	$35.00
No. 1 Bundles	35.00
No. 2 Bundles	35.00
Mechanical Bundles	31.50
Mixed Steel Scrap	31.00
Mixed Borings, Turnings	32.00
Rails, Remelting	35.00
Rails, Rerolling	38.00
Busheling	29.50
Bushelings new factory: Prep'd.	33.00
Unprep'd.	31.00
Short Steel Turnings	32.00
Cast Iron Grades*	
No. 1 Machinery Cast	55.00

* F.o.b. shipping point.

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The Metal Market

Lag in copper scrap shipments may force further cut in use of the metal for civilian goods. No increase in domestic price for copper is contemplated, says Wilson

NO INCREASE in domestic ceiling price of copper is contemplated by government officials. Any dealer who may be withholding deliveries of copper scrap on the premise that an increase may be allowed on the material has a patriotic duty to start the material moving, says Charles E. Wilson, director of defense mobilization.

Deliveries of copper scrap are running substantially below estimates and will affect production of civilian goods. "Deliveries of copper scrap are running substantially below the estimates on which CMP copper allocations are based," Mr. Wilson says. "This is a serious development, for unless copper scrap goals are met, there cannot be sufficient supplies of copper to meet CMP commitments."

Tighter Restrictions—Although certain projects are now under way to increase domestic production of copper, it will be early in 1953 before the results of these efforts are felt. Backlogs of unfilled orders for copper products have been climbing steadily, because DPA has been overestimating available supplies and has been issuing more allotment "tickets" for supplies than are actually available. To correct this situation, DPA is expected to reduce allotments of copper to less essential users in the third quarter, depending upon how many unfilled copper orders are still on producers' books June 30. Officials hope to bring CMP tickets into balance with the available supply of copper controlled materials in the third quarter of this year.

Brass mills and wire mills may accept priority orders for as much as 122 per cent of the copper controlled materials they will be able to turn out in the present quarter. The action will insure all users of getting eventually delivery of their government-backed orders for copper products. Orders that producers are unable to fill in the first quarter will be carried over into the second quarter and will be given preferential scheduling over orders issued in the second quarter.

Allocations of copper raw materials to controlled materials producers for February were reduced by National Production Authority. February allocations totaled 106,800 tons of refined copper compared with 120,000 tons in January and a monthly average of 115,639 tons in the August-December period of last year; of copper and copper-base alloy scrap, 77,100 tons against 65,600 tons in January and a monthly average of 61,700 tons in 1951. Classification of allocations in February on the basis of products produced is: Brass mill products, 46,583 tons of refined copper and 36,000 tons of scrap; wire mill products, 50,872 tons of refined copper and 27,500 tons of scrap; foundry products and others, 5785 tons of refined copper and 13,600 tons of scrap; exporters, 3560 tons of refined copper.

Brass Ingot Prices Revised

Prices of brass and bronze ingots containing large amounts of tin advanced ¼-cent to 3.25 cents a pound, effective as of Jan. 28. The amount of increase was determined by the quantity of tin involved in each alloy. This action was taken by ingot makers to counteract the advance in primary tin prices from $1.03 to $1.215 a pound.

Increases ranged from ½-cent to 3.25 cents a pound in the 88-10-2 group and from ¼-cent to 2.50 cents for alloys No. 295 through No. 321 in the 80-10-10 group. Alloys No. 322 through No. 327 in the latter group are unchanged.

Zinc Production Goal Set

While there are indications that the price of foreign zinc is approaching domestic ceilings, it will be some time before the supply situation may be expected to improve appreciably. Plans for increasing domestic supplies are for the most part of a long term nature. Greater civilian use may be permitted in 1953.

Defense Production Administration sets a domestic production goal of 1,320,000 net tons of zinc by 1955. The expansion will increase the annual supply by about 230,000 tons over the 1950 supply of 1,093,000 tons. Of this additional supply, 190,000 tons annual production will be supplied by new facilities, and the remaining 40,000 tons by anticipated changes in production from existing sources.

Of the 190,000 tons of additional supply from new facilities, 178,000 tons already have been certified by DPA for government assistance. Applications for government assistance for the balance of 12,000 tons are being reviewed.

In 1950, production of 623,000 tons were obtained from U. S. mines, 67,000 tons from secondary remelting and redistilling processes, and 403,000 tons from imports.

Safety Pins for Safety

LIFE in the Atomic Age places increased importance on the lowly safety pin. Federal Civil Defense Administration requests National Production Authority to set aside almost 71 tons of brass in 1952 to be used in manufacturing safety pins for the new-type burn dressings, to be stockpiled for use in emergencies following enemy attack.

Brass, coated with nickel, is the only type of safety pin which can be used satisfactorily with the new burn pads. Six pins are required to fasten each dressing. FCDA is buying 470,000 of the burn dressings for stockpiling by states participating in the federal-state matching program. This quantity constitutes about 10 per cent of the total number of burn dressings, state and federal, which are likely to be contracted for in fiscal 1952.

Mueller Buys Valley Metal

Mueller Brass Co., Port Huron, Mich., purchased all outstanding stock of Valley Metal Products Co., Plainwell, Mich., manufacturer of aluminum windows and extruder of special aluminum shapes. Mueller's new subsidiary will be operated as Vampco Division of the parent company.

Tyler Riggin is executive vice president of Vampco and Donald O. Stiles continues as general manager. Other officers of the subsidiary are identical with those of Mueller Brass.

Canada To Boost Exports

Canada agreed to increase exports to the United States by 15,800 tons of copper and by 31,700 tons of zinc over the 1951 movement. These tonnages are equivalent to about 1 per cent of total United States annual consumption of copper and about 3 per cent of zinc.

Lead, Zinc Ore Prices Rise

OPS authorized a ceiling price increase of 2 cents a pound for the lead and zinc content of domestic lead and zinc ores and concentrates and other lead and zinc bearing materials, such as residues, skimmings, etc., retroactive to Oct. 2, 1951. This increase will have no effect upon present ceiling prices for lead and zinc or of commodities made from them.

World Tin Output Gains

World production of tin-in-concentrates increased to 14,300 gross tons in October from 13,500 tons in the preceding month, due mainly to a sharp rise in Bolivian exports and heavier production in Malaya. Indonesian and Belgian Congo production declined. World production of tin metal increased to 14,000 tons in October from 13,100 tons in September.

World consumption of tin metal increased to 11,500 tons in October from 11,100 tons in September.

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 24.50c, Conn. Valley; Lake 24.62½c, delivered.

Brass Ingots: 85-5-5-5 (No. 115) 27.25c; 88-10-2 (No. 215) 40.00c; 80-10-10 (No. 305) 33.00c. No. 1 yellow (No. 405) 23.25c.

Zinc: Prime western 19.50c; brass special 19.75c; intermediate 20.00c. East St. Louis; high grade 20.85c, delivered.

Lead: Common 18.80c; chemical 18.90c; corroding 18.90c, St. Louis.

Primary Aluminum: 99% plus, ingots 19.00c; pigs 18.00c. Base prices for 10,000 lb and over. Freight allowed on 500 lb or more but not in excess of rate applicable on 30,000 lb c.l. orders.

Secondary Aluminum: Piston alloys 20.50c; No. 12 foundry alloy (No. 2 grade) 19.50c; steel deoxidizing grades, notch bars, granulated or shot, Grade 1, 18.80c; grade 2, 18.60c; grade 3, 18.40c; grade 4, 18.20c.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over 24.50c, f.o.b. Freeport, Tex.

Tin: Grade A, prompt 121.50c.

Antimony: American 99-99.8% and over but not meeting specifications below 50.00c; 99.8% and over (arsenic 0.05% max., other impurities 0.1% max.) 50.50c; f.o.b. Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 56.50c; 25-lb pigs 59.15c; "XX" nickel shot, 60.15c; "F" nickel shot or ingots, for addition to cast iron, 56.50c. Prices include import duty.

Mercury: Open market, spot, New York, $203-$207 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $1.56 per lb of alloy, f.o.b., Reading, Pa.

Cadmium: "Regular" straight or flat forms, $2.55 del.; special or patented shapes $2.80.

Cobalt: $7.99%. $2.40 per lb for 500 lb (kegs); $2.42 per lb for 100 lb (case); $2.47 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York 88.00c per oz.

Platinum: $90-$93 per ounce from refineries.

Palladium: $24 per troy ounce.

Iridium: $200 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Ceiling prices, cents per pound, f.o.b. mill; effective Aug. 23, 1951)

Sheet: Copper 41.68; yellow brass 38.28; commercial bronze, 95% 41.61; 90% 41.13; red brass, 85% 40.14; 80% 39.67; best quality, 39.15; nickel silver, 18% 53.14; phosphor-bronze grade A, 5% 61.07.

Rod: Copper, hot-rolled 37.53; cold-drawn 38.78; yellow brass free cutting, 32.63; commercial bronze, 95% 41.30; 90% 40.82; red brass 85% 39.83; 80% 39.36.

Seamless Tubing: Copper 41.72; yellow brass 41.29; commercial bronze, 90% 43.79; red brass, 85% 43.06.

Wire: Yellow brass 38.57; commercial bronze, 95% 41.90; 90% 41.42; red brass, 85% 40.43; 80% 39.96; best quality brass 39.44.

(Base prices, effective Dec. 26, 1951)

Copper Wire: Bare, soft, f.o.b. eastern mills, 100,000 lb lots 28.545; 30,000 lb lots, 28.67; l.c.l. 29.17. Weatherproof, 100,000 lb, 30.35; 30,000 lb, 30.60; l.c.l., 31.10. Magnet wire, del., 15,000 lb or more, 34.50; l.c.l., 35.25.

ALUMINUM

(30,000 lb base; freight allowed on 500 lb or more, but not in excess of rate applicable on 30,000 lb c.l. orders)

Sheets and Circles: 2s and 3s mill finish c.l.

Thickness Range Inches	Widths or Diameters, In. Inc.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	30.1	...	...
0.135-0.096	12-48	30.6	...	...
0.095-0.077	12-48	31.2	29.1	33.2
0.076-0.061	12-48	31.8	29.3	33.4
0.060-0.048	12-48	32.1	29.5	33.7
0.047-0.038	12-48	32.5	29.8	34.0
0.037-0.030	12-48	32.9	30.2	34.6
0.029-0.024	12-48	33.4	30.5	35.0
0.023-0.019	12-36	34.0	31.1	35.7
0.018-0.017	12-36	34.7	31.7	36.6
0.016-0.015	12-36	35.5	32.4	37.6
0.014	12-24	36.5	33.3	38.9
0.013-0.012	12-24	37.4	34.0	39.7
0.011	12-24	38.4	35.0	41.2
0.010-0.0095	12-24	39.4	36.1	42.7
0.009-0.0085	12-24	40.6	37.2	44.4
0.008-0.0075	12-24	41.9	38.4	46.1
0.007	12-18	43.3	39.7	48.2
0.006	12-18	44.8	41.0	52.8

* Lengths 72 to 180 inches. † Maximum diameter, 26 inches.

Screw Machine Stock: 5000 lb and over.

Dia. (In.) of distance across flats	—Round— R317-T4, 17S-T4	R-317-T4	—Hexagonal— 17S-T4
0.125	52.0	....	....
0.156-0.0188	44.0	....	....
0.219-0.313	41.5	....	....
0.375	40.0	46.0	48.0
0.406	40.0	....	....
0.438	40.0	46.0	48.0
0.469	40.0	....	....
0.500	40.0	46.0	48.0
0.531	40.0	....	....
0.563	40.0	....	45.0
0.594	40.0	....	....
0.625	40.0	43.5	45.0
0.688	40.0	....	45.0
0.750-1.000	39.0	41.0	42.5
1.063	39.0	....	41.0
1.125-1.500	37.5	39.5	41.0
1.563	37.0	....	....
1.625	36.5	....	39.5
1.688-2.000	36.5	....	....

LEAD

(Prices to jobbers f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more $24.00 per cwt; add 50c cwt 10 sq ft to 140 sq ft. Pipe: Full coils $24.00 per cwt. Traps and bends: List prices plus 65%.

ZINC

Sheets 26.50c, f.o.b. mill 36,000 lb and over. Ribbon zinc in coils, 25.00c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 25.50-26.50c; over 12-in., 25.50-26.50c.

"A" NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 77.00c. Strip, cold-rolled, 83.00c. Rods and shapes, 73.00c. Plates, 75.00c. Seamless tubes, 106.00c.

MONEL

(Base prices f.o.b. mill)

Sheets, cold-rolled 60.50c. Strip, cold-rolled 63.50c. Rods and shapes, 58.50c. Plates, 59.50c. Seamless tubes, 93.50c. Shot and blocks, 53.50c.

MAGNESIUM

Extruded Rounds 12 in. long, 1.31 in. in diameter, less than 25 lb, 55.00-62.00c; 25 to 99 lb, 45.00-52.00c; 100 lb to 5000 lb, 41.00c.

TITANIUM

(Prices per lb 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $10; forgings, $6; hot-rolled and forged bars, $6.

Plating Materials

Chromic Acid: 99.9% flakes, f.o.b. Philadelphia, carloads, 27.00c; 5 tons and over 27.50c; 1 to 5 tons, 28.00c; less than 1 ton 28.50c.

Copper Anodes: Base 2000 to 5000 lb; f.o.b. shipping point, freight allowed: Flat, rolled, 38.34c; oval 37.84c.

Nickel Anodes: Rolled oval, carbonized, carloads, 74.50c; 10,000 to 30,000 lb, 75.50c; 3000 to 10,000 lb, 76.50c; 500 to 3000 lb 77.50c; 100 to 500 lb, 79.50c; under 100 lb, 82.50c; f.o.b. Cleveland.

Nickel Chloride: 36.50c in 100 lb bags; 34.50c in lots of 400 lb through 10,000 lb; 34.00c over 10,000 lb, f.o.b. Cleveland, freight allowed on 400 lb or more.

Sodium Stannate: 25 lb cans only, less than 100 lb. to consumers 86.7c; 100 or 350 lb drums only, 100 to 600 lb 71.6c; 700 to 1900 lb, 69c; 2000 to 9900 lb, 67.3c. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Tin Anodes: Bar, 1000 lb and over, $1.375; 500 to 999 lb, $1.38; 200 to 499 lb, $1.385; less than 200 lb, $1.40. Freight allowed east of Mississippi and north of Ohio and Potomac.

Zinc Cyanide: 100 lb drums, less than 10 drums 47.7c, 10 or more drums, 45.7c, f.o.b. Niagara Falls, N. Y.

Stannous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb $1.11; more than 2000 lb, $1.09. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Stannous Chloride (Anhydrous): In 400 lb bbl, 98.5c; 100 lb kegs 99.5c. Freight allowed.

Scrap Metals

Brass Mill Allowances

Ceiling prices in cents per pound for less than 20,000 lb, f.o.b. shipping point, effective June 26, 1951.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	21.50	21.50	20.75
Yellow Brass	19.125	18.875	17.875
Commercial Bronze			
95%	20.50	20.25	19.75
90%	20.50	20.25	19.75
Red Brass			
85%	20.25	20.00	19.375
80%	20.125	19.875	19.375
Muntz metal	18.125	17.875	17.375
Nickel silver, 10%	21.50	21.25	10.75
Phos. bronze, 5%	25.25	25.00	24.00

Copper Scrap Ceiling Prices

(Base prices, cents per pound, less than 40,000 lb f.o.b. point of shipment)

Group I: No. 1 copper 19.25; No. 2 copper wire and mixed heavy 17.75; light copper 16.50; No. 1 borings 19.25; No. 2 borings 17.75; refinery brass, 17.00 per lb of dry Cu content for 50 to 60 per cent material and 17.25 per lb for over 60 per cent material.

Group II: No. 1 soft red brass solids 18.50; No. 1 composition borings 19.25 per lb of Cu content plus 63 cents per lb of tin content; mixed brass borings 19.25 per pound of Cu content plus 60 cents per lb of tin content; unlined red car boxes 18.25; lined red car boxes 17.25; cocks and faucets 16.00; mixed brass screens 16.00; zincy bronze solids and borings 16.25.

Zinc Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment) Unsweated zinc dross, 13.75c; new clippings and trimmings, 15.50c; engravers' and lithographers' plates, 15.50c; die cast slabs, min. 90% zinc, 13.75c; old zinc scrap, 12.25c; forming and stamping dies, 12.25c; new die cast scrap, 11.75c; old zinc die cast radiator grille, 11.50c; old die cast scrap, 10.50c.

Lead Scrap Ceiling Prices

(F.o.b. point of shipment)

Battery lead plates, 19.00c per lb of lead and antimony content, less smelting charge of 2 cents per lb of material in lots 15,000 lb or more; less 2.25c in lots less than 15,000 lb. of a flat price of 11.25c a pound of battery plates. Used storage batteries (in boxes) drained of liquid, 7.65c for 15,000 lb or more; 7.45c for less than 15,000 lb. Soft lead scrap, hard lead scrap, battery slugs, cable lead scrap or lead content of lead-covered cable scrap, 17.25c in lots of 20,000 lb or more; 16.50c in lots under 20,000 lb.

Aluminum Scrap Ceiling Prices

(Cents per pound f.o.b. point of shipment, less than 5000 lb)

Segregated plant scrap: 2s solids, copper free, 10.50; high grade borings and turnings, 8.50; No. 12 piston borings and turnings, 7.50; Mixed plant scrap; Copper-free solids, 10.00; dural type, 9.00; Obsolete scrap: Pure old cable, 10.00; sheet and sheet utensils, 7.25; old castings and forgings, 7.75; clean pistons, free of struts, 7.75; pistons with struts, 5.75.

DAILY PRICE RECORD

1952	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Jan. 22-31	24.50	18.80	19.50	121.50	19.00	50.00	56.50	88.00
Jan. 2-21	24.50	18.80	19.50	103.00	19.00	50.00	56.50	88.00
1951								
Dec. Avg.	24.50	18.80	19.50	103.00	19.00	50.00	56.50	88.00
Nov. Avg.	24.50	18.80	19.50	103.00	19.00	44.56	56.50	88.00
Oct. Avg.	24.50	18.726	19.426	103.00	19.00	42.00	56.50	88.12
Sept. Avg.	24.50	16.80	17.50	103.00	19.00	42.00	56.50	90.16
Aug. Avg.	24.50	16.80	17.50	103.00	19.00	42.00	56.50	90.16
July Avg.	24.50	16.80	17.50	106.00	19.00	42.00	56.50	90.16
June Avg.	24.50	16.80	17.50	117.962	19.00	42.00	56.50	88.492
May Avg.	24.50	16.80	17.50	139.923	19.00	42.00	50.50	90.16
Apr. Avg.	24.50	16.80	17.50	145.735	19.00	42.00	50.50	90.16

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, del. New York; Aluminum primary ingots, 99%, del.; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked. Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

Semifinished Steel . . .

Semifinished Prices, Page 183

Los Angeles—Heaviest rainstorms in decades coupled with a two-week old strike at the Torrance plant of Columbia-Geneva Division, U. S. Steel Co. reduced Far Western ingot production to 95.5 per cent of rated capacity.

Some 15,000 tons of steel were lost due to the two-week old walk-out by steel workers at U. S. Steel Co.'s Columbia-Geneva Division mill at Torrance, Calif. The strike started when the company discharged two laborers for insubordination.

Tubular Goods . . .

Tubular Goods Prices, Page 187

Seattle—Demand for cast iron pipe is slow but spring inquiry is expected soon. Vancouver, Wash., opened bids Jan. 29 for an unstated tonnage and 150 tons have been placed for the Navy's Tacoma base.

Sheets, Strip . . .

Sheet and Strip Prices, Page 183 & 184

Cleveland—Although demand pressure for cold-rolled sheets and strip is definitely easier, overall requirements for the light flat-rolled products continue heavy. The mills are virtually booked full for second quarter and anticipate no trouble in filling whatever gaps in schedules appear between now and midyear. In addition to the cold-rolled items, specialties such as chrome and electrical sheets appear in adequate supply to meet market demands. Galvanized sheets, however, continue tight and the pressure for hot-rolled sheets is increasing. In the case of galvanized, no appreciable easing in supply conditions is anticipated for months despite reports of improving zinc supply.

Pittsburgh—Mills attribute easing in cold-rolled sheet supply to decreasing demand, increasing rolling and finishing capacity and recent cutbacks in allotments to domestic appliances. Straight chrome and electrical silicon sheets are in excellent supply. Hot-rolled and galvanized are tight. Galvanized sheets will be the last grade to soften because of the zinc shortage which is at present hindering volume production. Second quarter tonnage is being entered on books in slow but satisfactory manner—quite different from last year's rush. Some district mills are making spot offerings of small-to-average tonnages of cold-rolled material due to unexpected cancellations and better than average mill production. With hot mills rolling light gage plates, however, any easing in flat-rolled demand will not affect operations in this area.

New York—Spot openings in mill schedules for cold-rolled sheet continue. Some are due to cancellations on consumer hard goods account. Another factor has entered the picture, however, in that some tin plate producers find they have insufficient first quarter CMP tickets on hand to devote their full cold-rolling capacity to tin plate production and consequently have openings in rolling schedules for cold-rolled sheets. Some

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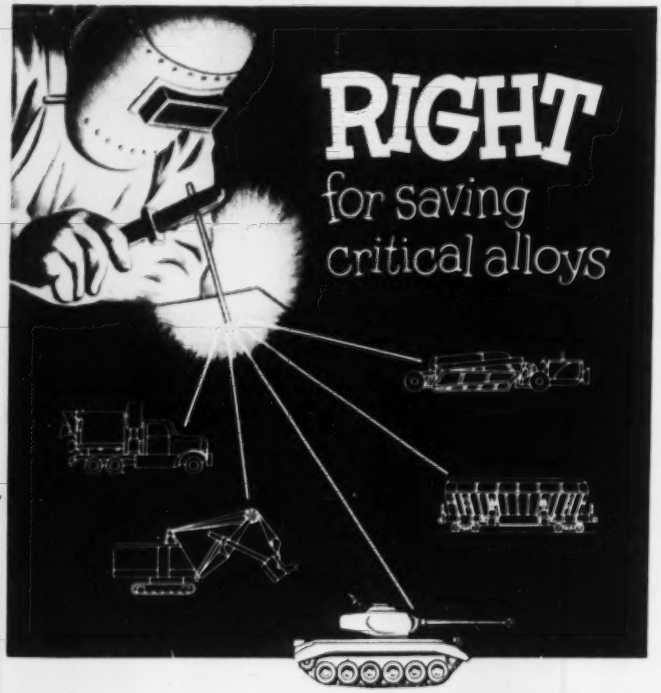

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warehouses have been approached by mills in this position with offerings of more tonnage. Distributors are entitled to 100 per cent of base period receipts and even more if it is available.

Philadelphia — Lessening pressure for tin plate is contributing to better flow of cold-rolled sheets. This situation is temporary since tin plate demand for second quarter is expected to utilize all available facilities. In addition to cold-rolled, light silicon steels and enameling stock are in better supply. In the case of straight chrome, supply is so easy the metal has been decontrolled.

Boston—Heaviest military demand for narrow cold-rolled strip is for links and clips for small arms ammunition. In carbon steel this volume, while substantial with some consumers, does not balance the slack in civilian tonnage.

Detroit—Wildcat strike of about 1000 men in Ford Motor Co.'s rolling mill at the Rouge shut off production from its hot and cold strip mills, and the bar mill.

Cincinnati — District sheet mills, filling second quarter schedules, find no relaxing in tight supply for hot-rolled, although cold-rolled is easier. Pressure for enameling stock and other specialties is off.

Steel Bars . . .

Bar Prices, Page 183

New York—Carbon bar consumers without homes for their CMP tickets, and who are privileged under government regulations to approach producers for April steel on a first-come-first-served basis during the current 15-day period, which began Feb. 1, find little tonnage available. Regular customers of producers generally have specified 60 per cent of full quotas for second quarter, as permitted by Washington, and in many cases have specified a substantial portion for delivery in April. Actually they can specify up to 50 per cent of the 60 per cent for any one month if they so desire.

Boston—Demand for carbon steel bars is heavy, notably larger sizes. Little, if any, easing in demand is indicated for second quarter. Pressure for hot-rolled stock is strong with converters taking full base period allocations. Defense volume in cold-finished bars is heavier with consumers taking fixed monthly tonnages on a continuing contract basis.

Pittsburgh—Defense tonnage is rapidly filling up any gaps in rolling schedules caused by cutbacks in automotive and civilian durable goods. Tightest items are cold-finished and forging grades. No appreciable relief in supply is expected for months to come. Larger sizes are tightest. Bookings for second quarter are just about completed and producers expect there will be many uncashed CMP tickets. Carryover into second quarter is expected to be as large as at year-end 1951.

Cleveland — Cutbacks in civilian goods manufacture have not resulted in any noticeable easing in demand pressure for bars, especially the large sizes. Defense requirements are rising and overall demand is running in excess of production. Second quarter books are about filled and indications are carryover from first to sec-

ond quarter will be substantial. Fewer CMP tickets for bars are out than formerly, but many are being turned away by mills already booked to the limit.

Chicago — Hot-rolled bars are extremely tight but producers, now and then, are able to offer customers some additional tonnage. Lack of CMP tickets sometimes prevents taking advantage of these offerings. On the other hand, users who have received additional first-quarter tickets through hardship appeals to NPA experience difficulty in finding a home for them.

Tin Plate . . .

Tin Plate Prices, Page 184

Philadelphia—Tin plate producers are not receiving sufficient tickets to fully engage capacity. Hence, in some cases, these interests have facilities for producing more cold-rolled sheets than they anticipated, thus contributing temporarily to the easier trend in this latter product.

Pittsburgh—If pig tin can start moving soon from Britain on the exchange deal, mills feel confident their allotments will be substantial enough to sustain current production during second and third quarters. It will require about 7800 tons per quarter.

Stainless Steel . . .

Stainless Steel Prices, Page 187

Washington—Chrome stainless steel was decontrolled by the National Production Authority Jan. 28. Consumers no longer must obtain CMP-4B tickets to purchase this metal. Decontrol is effected under Direction 9 to CMP Reg. 1.

Production continues under control of the melt schedule order, M-80, by which mill output of all alloy steel is regulated, and under basic steel order M-1, which regulates steel production by directives. The 45-day inventory limitation also remains in effect.

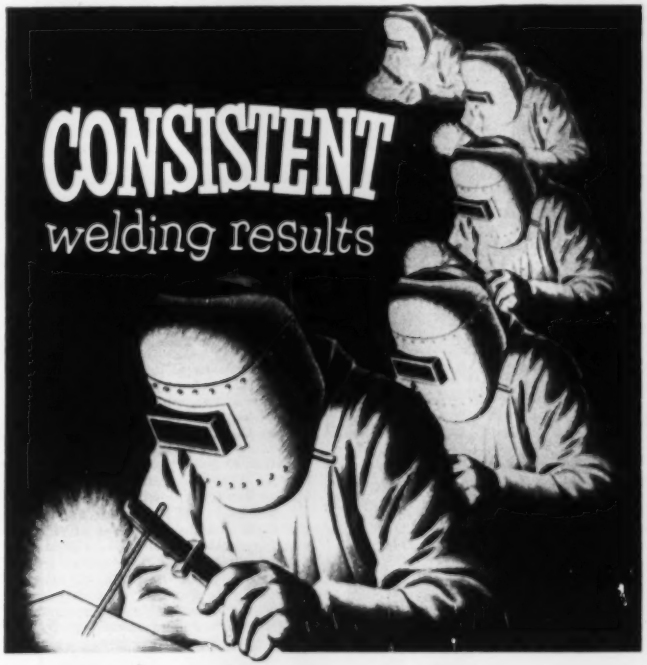
Removal of purchase restrictions on chrome stainless had been expected since fabricators have not been absorbing the available tonnage.

Steel suppliers are requested to continue listing chrome stainless orders on melt schedules filed with NPA, by this means NPA seeking to keep close tabs on demand-supply conditions and thus be in position to reimpose controls if necessary.

Concurrent with issuance of Direction 9, NPA also amended Direction 1 to CMP Reg. 1, effective immediately, reducing from 1500 pounds to 500 pounds the amount of nickel-bearing stainless steel which one person may obtain in a quarterly period by self-certification of orders.

In still another action, NPA amended Reg. 1 to include rutile and non-nickel bearing stainless steel in the list of materials subject to inventory controls. Rutile inventories are virtually exhausted. Inventories of rutile now are limited to 45 days or a practicable minimum working inventory. The same applies to chrome steel.

Between 6000 and 8000 tons of rutile are produced annually in this country, far short of the nation's needs, which in 1951 amounted to



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23,000 tons. About 12,000 tons alone went into the coating of welding rod last year, largest single use.

Wire . . .

Wire Prices, Page 185

Boston—Easing in demand for some wire products is attributed to lagging defense buying, notably for aircraft. Delay in acquiring supplemental or full allotments for second quarter also is a factor. High carbon rod supply is improved. Inventories of finished wire are nearer balance. Smaller automobile assembly is reflected in slower demand for screws.

Plates . . .

Plate Prices, Page 183

Philadelphia—District platemakers have little tonnage to offer consumers for April on a first-come-first-served basis. The 15-day mandatory period in which producers must accept tonnage on this basis for two months hence, provided they have any to spare, began Feb. 1. Regular customers placed substantial specifications for that month and there will be a definite carryover at the end of the quarter.

Further ship work is developing. The New York Shipbuilding Corp., Camden, N. J., was awarded close to $60 million in Navy work. Approximately $30 million is to be spent converting two heavy cruisers into guided missile ships and the remainder on the construction of three fleet oilers. Another contract for two fleet oilers costing about $10 million apiece, has been placed with Ingalls Shipbuilding Corp., Pascogoula, Miss.

Lukens Steel Co., Coatesville, Pa., will suspend operations on its 120-in. plate mill three weeks in April for necessary repairs.

Boston—Plate schedules for April are closed in most cases. One 120-in. mill is going down for repairs that month in the East. Spun and pressed head deliveries are approximating those for plates. Light gage plates for second quarter are offered in some cases where fabricators lack tickets to take up tonnage.

New York—Heavy gage plate continues exceedingly scarce. One supplier has little to offer at more than three inches in thickness, due to shortage of hot top steel now being diverted in increasing tonnage to armaments. The lighter gages are in somewhat better supply, due to increasing amount of strip plate being produced.

Pittsburgh—Supply continues tight. Mills see no easing during the remainder of 1952. Lighter gages are in a somewhat better supply due to diversion of rollings to continuous hot-strip mills which can produce the desired widths. Fabricating shops have no success finding the tonnage they need to handle business available to them today.

Cleveland—Fabricators are finding it easier to pick up tonnages of light plates but the heavy gages continue as scarce as ever. Rolling of light plates on the continuous mills is resulting in some stock accumulations at warehouses. The continuous mills anticipate further directives from the government stepping up production of light plates with an expansion in the shipbuilding program projected. Just when this enlarged demand will come is not yet clear.

Chicago—Plate fabricators report a somewhat brighter outlook in their material acquisitions. Wide heavy plates are hard to get but the narrow and lighter ones are easing noticeably. Few shops expect anything resembling normal for months to come.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 183

Washington—Tailored pricing regulation on fabricated concrete reinforcing bars is under consideration by Office of Price Stabilization. Proposal, discussed at a meeting of OPS with members of the industry advisory committee, in general, provides for determination of price ceilings on the basis of a dollars-and-cents markup over current mill costs, plus size, quantity, bending and engineering extras. Historical pricing practices and methods in the industry are included.

Seattle—Mill backlogs, though substantial, are lower than a month ago. Several projects are pending for placement within 30 days. Considerable business in less than 100 ton lots has been placed of late.

Structural Shapes . . .

Structural Shape Prices, Page 183

New York—Fabricated structural steel shipments last year totaled 2,702,262 tons, largest since the 2,987,200 ton total in 1930. Last year's shipments exceeded those in 1950 by 426,000 tons. December shipments amounted to 202,679 tons, somewhat less than the average monthly rate of 225,000 tons.

Bookings last year amounted to 2,931,072 tons and, exclusive of the preceding year's total of 3,165,579 tons, represented the highest annual figure since the 1929 record year for bookings. December bookings were, 202,835 tons, largest since August but below the monthly average of 244,000 tons.

Backlogs as of Dec. 31 amounted to 2,670,202 tons of which 44 per cent was scheduled for production within the first four months of this year.

New York—Ban against use of foreign steel in state public works projects was lifted by the New York State Thruway Authority for duration of the acute domestic steel shortage. The action aims to speed construction of the 450-mile cross-state highway and help "stave off the prospect of unemployment in the construction industry." State authorities say that while foreign steel might cost more, most big contractors would find it more economical than to have their equipment idle.

NPA has announced additional authorization to commence or continue in the current quarter 16 commercial and institutional building projects in New York state and New Jersey, costing $4,037,000. On the other hand, it disapproved 36 projects, costing $11,200,000.

Boston—Prices on smaller fabricated structural steel inquiry are lower, reflecting decline in new volume and more competitive bidding. Larger

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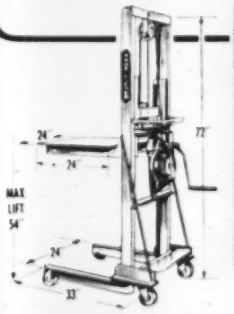

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shops are filled for second quarter, but some district plants have openings for that period, in some cases lacking tickets for plain material procurement.

Pittsburgh—No letup in demand for all sizes and shapes of structurals is noted by district producers. While many think the shortage will be relieved by mid-year new authorizations for bridges and public buildings could throw the supply-demand picture completely out of kilter again. Some market authorities think we can expect increased defense business which will take up any slack resulting from completion of present building and construction programs.

Seattle—Pending public works projects include Albeni Falls dam and power house involving 3000 tons of shapes and a like tonnage of structurals, bids to U. S. Engineer, Seattle, Mar. 6. Fabricators are figuring a number of other jobs, including several in Alaska requiring substantial tonnage. Steel scarcity is restricting bidding.

Pig Iron . . .

Pig Iron Prices, Page 182

Cleveland—Light gray iron castings shops need work. Consequently they are not pressing for pig iron in the former volume. Heavy and medium castings plants are busy and are taking all the iron they can get. Government inventory limitations prevent excessive accumulations by shops on restricted production schedules. Cutbacks in civilian goods manufacture, especially automobiles, has hit the latter severely and defense work is not developing as rapidly as had been hoped. Currently, the foundries are encouraged by word from Washington a substantial defense truck program will likely get going in second quarter with attending betterment in castings demand.

Boston—Most foundries have sufficient iron to support melting schedules. There are some deferments in contract shipments. Machine tool demand trend is upward. Some castings shops will not reach production peak until late this year. Basic iron requirements are in excess of supply. One steelworks is operating on 50 per cent foreign iron costing around $80 per ton, delivered works.

New York—Although district gray iron foundry operations still lag, demand for pig iron is well sustained. Slower castings production is reflected more in easing demand for cast scrap, as operators attempt to bring their mix into a better balance by curtailing on this latter material and stepping up use of pig iron.

Buffalo—District pig iron production again is at 100 per cent of capacity. The one idle furnace was relighted by the leading merchant seller.

Philadelphia—Stringency in pig iron is reflected in resumption of inquiry for foreign iron. Gray iron foundry operations lag, but most foundries are interested in obtaining more iron to improve their mix, at the expense of cast scrap.

Chicago—There's a place for all the the pig iron produced for sale despite the fact gray iron foundries are running well below capacity. Iron supply fluctuates as result of the greater

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need for hot metal for steelmaking to offset scrap deficiency, also because some makers are finding their own foundry affiliates have increasing requirements.

Seattle — Foundry operations are above normal seasonal level in this area. Current inquiries indicate a busy spring. More domestic pig iron is available in larger lots. Foreign iron, averaging about $10 per ton is hard to get and is being purchased only to augment stocks of domestic grades to sustain operations.

Scrap . . .

Scrap Prices, Page 190

Pittsburgh—Thanks to NPA allocations, the district's largest steelmaker was able to return to operation three of its five open-hearth furnaces down due to critical scrap shortage. The company now has 2-3 days supply and if good weather continues it hopes to maintain near-capacity operations. Dealers report scrap movement more encouraging. Auto-wrecker tonnage seems to be picking up.

Detroit—Pressure is easing on the local scrap market. Mills are gobbling all they can get but some fear next quarter's steel demand will not support capacity operations. OPS inspectors are active in this area. The mills are showing a higher degree of selectivity as to quality.

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PORT HOPE, ONTARIO, CANADA

Boston—Although yards are paying ceiling prices for steel scrap, $26.17 for unprepared heavy melting, intake is disappointing except for a flurry in auto material. Consumers' inventories are low. Dealers expect more difficulty meeting new allocations. Cast scrap demand is soft. Under-ceiling prices are reported for some grades with little pressure from the foundries for tonnage.

New York—Adverse weather retards the flow of scrap, but operations at consuming plants have not been curtailed. Virtually all open hearth material is moving under allocation. Cast grades continue to ease, reflecting lagging foundry operations.

Buffalo—The three leading mill consumers here are in better inventory position because of allocations. Dealers report no material moving out of the area under allocation, but a fair tonnage is being shipped to outside users under reciprocal deals.

Philadelphia—Despite the shortage of open-hearth steel scrap, district mills have been able to sustain operations at virtual capacity. Widespread allocations have enabled them to receive enough tonnage to keep going. Cast grades are in easy supply.

Cleveland—Dealers here report a sharp decline in receipts of industrial scrap, particularly from plants in the automotive industry. Mills continue to press for shipments, creating an exertmely firm market. Demand from foundries is spotty.

Cincinnati—Improvement in scrap tonnage moving to mills is sustained. Stocks are far from normal but more exacting inspection is noted. Demand for cast, excepting heavy breakable, is off.

Chicago—Subzero weather restricted yard operations last week causing steel mills to lose more ground in their attempt to bolster scrap inventories. Because of heavy shipments and poor intake, yards report stocks far below normal. Despite allocations the situation of U. S. Steel Co. remains critical with only one-day supply at Gary and four days at South Works. The three Gary open hearths idled at start of the year continue cold. Cast scrap remains plentiful.

Birmingham—Definite easing in scrap supply is evident here with reports additional moderate tonnages of free steel are in evidence. Cast grades are meeting selective buying.

Warehouse . . .

Warehouse Prices, Page 189

Cleveland—Stocks of finished steel products, especially light, flat-rolled items, are improving. Distributors are adopting a cautious attitude in accepting mill offers. Some extra tonnage has been turned down, including hot-rolled and cold-rolled sheets. Mill seconds and rejects are moving sluggishly, and light plates, in much better supply, are not being taken by consumers in the volume expected. Bars, especially large sizes, are hard to get. There is little prospect for supply improvement soon. Certain building steel items, such as light structurals, are more freely available. Heavy structurals continue tight.

Warehouse prices on prime steel products are firmly established for the separate distributors under CPR 98. In the case of seconds and rejects, however, a schedule remains to be worked out. Last week sellers of such items conferred with OPS with a view to developing a ceiling price formula.

Boston—Distributors are building inventories of some products slightly, exceptions being quality bars in the larger sizes, and plates. Improvement in hot-rolled strip is pronounced. Lack of tickets by some customers is limiting purchases from warehouse.

Philadelphia—Warehouses are increasing their over-all inventories slightly, due mainly to better supply of cold-rolled sheets and strip. However, they are having difficulty building stocks of bars and plates.

Pittsburgh—Some indication of demand easing is noted. Warehouse items in good supply include small sizes of pipe and nails, and smaller diameter cold-finished rounds. Galvanized sheets are hard to obtain as are larger size cold-finished bars and certain gages of cold-rolled sheets. Plates and structural shapes continue tight.

Detroit—Scattered price reductions were put into effect in conformity with the warehouse pricing regulation. Affected products are hot and cold-rolled sheets and carbon plates. The warehouses' lower costs result from buying and shipping in 80,000 pounds or greater quantities.

Washington—No basic changes in warehouse ceiling price regulations were suggested at the recent meeting of the industry advisory committee with the Office of Price Stabilization.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

2580 tons, drum shop, Foster Wheeler & Co., Buffalo, to Ingalls Iron Works, Birmingham.

480 tons, boiler station, Palm Beach, Fla., to Pittsburgh Bridge & Iron Works, Pittsburgh.

480 tons, Catholic high school, Kingston, Pa., to Anthracite Bridge Co., Scranton, Pa.

425 tons, building, New York Telephone Co., 37th street, New York, to Dreier Structural Steel Co, Inc., Long Island City, N. Y.

130 tons, Washington state viaduct, Chehalis, to Poole, McGonigle & Dick, Portland, Oreg., State Construction Co., Seattle, general contractor.

STRUCTURAL STEEL PENDING

4000 tons, Albeni Falls dam and powerhouse, Pend Oreille river, Washington; bids to U. S. Engineer, Seattle, Mar. 6.

1400 tons, section of the Major Deegan expressway, Bronx, New York; bids closed by the state Jan. 30.

600 tons, western approach to Tarrytown-Nyack bridge; bids closed by the New York State Thruway Authority, Jan. 30.

450 tons, auto maintenance shop, Elmendorf air base, Alaska; general contract awarded Denali Construction Co., Anchorage, $2,108,000.

400 tons, Pennsylvania Railroad repair shop, Pitcairn, Pa.; bids Feb. 7.

397 tons, state bridge work, Hudson county, New Jersey; bids Feb. 14.

350 tons, relocation railroad lines and bridges, McNary dam project; bids to U. S. Engineer, Walla Walla, Wash., about Mar. 4.

200 tons, freight car facilities for Pennsylvania Railroad, Morrisville, Pa.; bids cosed.

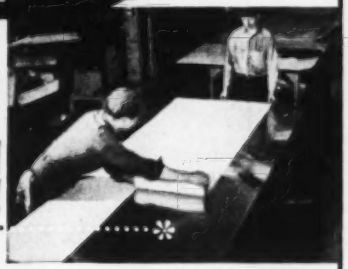
175 tons, addition, Bancroft Hall, United States Naval Academy, Annapolis, Md.; bids closed.

120 tons, turbogenerator foundation, Connecticut Light & Power Co., New London, Conn.; bids Feb. 4.

110 tons, state bridge, New Castle county, Delaware; bids Feb. 20.

100 tons, Army medical center, Washington; bids Mar. 4.

Mystik Protecto-Mask



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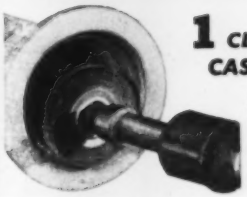
Ask your supplier or write for full information and sample. Mystik Adhesive Products, 2678 N. Kildare, Chicago 39.

Pittsburgh Brushes Solved these Problems!



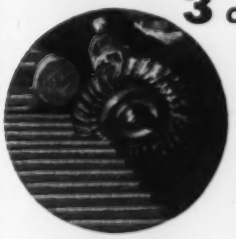
1 CLEANING RED-HOT CASTINGS in 30 seconds!

A Pittsburgh brush answered U. S. Pipe and Foundry's problem of cleaning red-hot castings. This rugged brush works 40 hours a week, turning out thoroughly cleaned castings at the rate of one every 30 seconds . . . a speed record for any brush cleaning operation of this type.

2 POLISHING 10,000 heating units!

When the Edwin L. Wiegand Company wanted to remove ragged edges from their *Chromalox* Heating Units economically and *fast*, they turned to rough, tough Pittsburgh Brushes for the answer. The 6" Pittsburgh steel wire brushes they installed polish 10,000 heating units during their life.

3 CLEANING WELDS in close quarters!



Allis-Chalmers' problem was to find a brush narrow enough to fit between cooling fins of transformer radiators, yet strong enough to remove slag and spall on welds which could conceal pressure-reducing pinholes. Pittsburgh engineers recommended an 8" rotary wire brush. Problem was solved!

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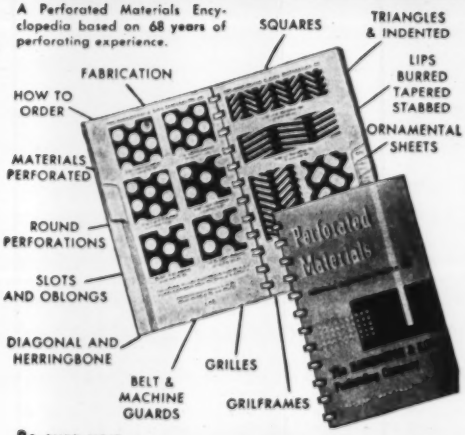
Where to use Perforated Material
Why H & K Perforated Material?

A Perforated Materials Encyclopedia based on 68 years of perforating experience.



Be sure you have H & K General Catalog 62 —Write for it

The Harrington & King Perforating Co

5634 Fillmore St., Chicago 44, Ill.
114 Liberty St., New York 6, N. Y.

3100 tons, single span stringer bridge, Pittsfield, Mass.

3500 tons, including plates, takeoff structures, etc., Ross dam project; bids opened by Seattle, Jan. 30.

3100 tons, highway bridges, Hungry Horse, Mont.; Illinois Steel Bridge Co., Jacksonville, Ill.; low to Bureau of Reclamation, Denver.

Unstated, three structures, slope, etc., Larson air base, Washington state; bids to U. S. Engineer, Walla Walla, Wash., Feb. 26.

Unstated, supply warehouse, Rainier ordnance depot, Washington; Zoss Construction Co., Portland, Oreg., low $1,346,500.

Unstated, Bureau of Roads & Bridges, Snohomish county, Washington, general contract to F. L. Dooley Construction Co., Seattle.

REINFORCING BARS . . .

REINFORCING BARS PLACED

160 tons, Washington state highway viaduct, Vancouver, to unstated Portland, Oreg., supplier; Halvorson Construction Co., Portland, general contractor.

140 tons, storage reservoir, Bend, Oreg., to Mercer Steel Co., Portland, Oreg.; State Construction Co., Seattle, general contractor.

REINFORCING BARS PENDING

6000 tons, Albeni Falls dam and powerhouse, Washington state; bids to U. S. Engineer, Seattle, Mar. 6.

2500 tons, Units 1 and 2, Public Service Co. of Northern Illinois, Will county, Illinois.

2200 tons, western approach to Tarrytown-Nyack bridge; bids closed by the New York State Thruway Authority, Jan. 30.

825 tons, auxiliary outlet sewer, Indiana avenue, contract 43, Chicago.

600 tons, substructure, bridge project U-264, Heartdatown, Ill.

500 tons, water works, Salem, Ill.

195 tons, naval ammunition depot, Hastings, Nebr.

345 tons, Prospect dial office, Illinois Bell Telephone Co., Chicago.

288 tons, state bridge work, Butler county, Pennsylvania; bids Feb. 21.

265 tons, Dunbar-South Charleston bridge, Dunbar, W. Va.

235 tons, Chatham dam, Cumberland river, Nashville, Tenn.

225 tons, government storage warehouse, Binghamton, N. Y.

121 tons, Central office, Wisconsin Telephone Co., Milwaukee.

110 tons, state bridge work, Hudson county, New Jersey; bids Feb. 14.

PLATES . . .

PLATES PENDING

150 tons, arch web section sheet steel piling; bids to Bonneville Power Administration, Portland, Oreg., Feb. 6.

PIPE . . .

CAST IRON PIPE PLACED

150 tons, replacement job at Tacoma Navy base, to Pacific States Cast Iron Pipe Co., Provo, Utah.

CAST IRON PIPE PENDING

95 tons, also 65 tons steel pipe and conduits, Albeni Falls dam project; bids to U. S. Engineer, Seattle, Mar. 6.

Unstated, system expansion, Vancouver, Wash.; bids in Jan. 29.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Central of Brazil, forty-eight 1000-hp diesel-electric road locomotive units, to Montreal Locomotive Works, Montreal, Que.

Erie, 42 diesel-electric locomotive units; ten 1200-hp yard switchers to Baldwin-Lima-Hamilton Corp., Eddystone, Pa.; ten 1500-hp road switchers for freight service, six 1600-hp road switchers for passenger and freight services and two 1000-hp yard switchers to American Locomotive-General Electric Companies, Schenectady, N. Y.; twelve 1500-hp road switchers for freight service and two 1500-hp road switchers for passenger and freight service, to Electro-Motive Division, General Motors Corp., La Grange, Ill.

Indonesia State Railways, twenty-seven 1600-hp diesel-electric locomotives, to International General Electric Co. Inc., Erie, Pa.

RAILROAD CARS PLACED

Canadian National Railways, 100 dump cars to Canadian Car & Foundry Ltd., Montreal, Que.

Canadian Pacific, 500 fifty-ton box cars, to Pullman-Standard Car Mfg. Co., Chicago.

Chicago & Northwestern, 300 seventy-ton ore cars to the Johnstown, Pa., plant of Bethlehem Steel Co., and 350 seventy-ton covered hopper cars, to the Butler, Pa., plant of Pullman-Standard Car Mfg. Co., Chicago.

Escanaba & Lake Superior, 10 fifty-ton box cars to Pullman-Standard Car Mfg. Co., Chicago.

Foreign Service, 80 railway kitchen troop-hospital cars, to St. Louis Car Co., St. Louis, and 300 maintenance cars, with 230 going to Kalamazoo Mfg. Co., Kalamazoo, Mich., and 70 to Northwestern Motor Co., Eau Claire, Wis.

Louisville & Nashville, 125 seventy-ton covered hopper cars, to Pullman-Standard Car Mfg. Co., Chicago.

Minneapolis, St. Paul & Sault Ste. Marie, 400 fifty-ton box cars and 100 fifty-ton hopper cars, to its own shops.

Nashville, Chatanooga & St. Louis, 25 seventy-ton covered hopper cars, to Pullman-Standard Car Mfg. Co., Chicago.

Transportation Corps, 100 flat cars to Thrall Car Mfg. Co., Chicago.

RAILROAD CARS PENDING

Union Pacific, 2600 freight cars, bids asked; list comprises 500 seventy-ton ore cars, 500 seventy-ton hopper cars, 500 seventy-ton flat bottom gondola cars, 500 fifty-ton box cars, 500 fifty-ton automobile box cars and 100 seventy-ton mill type drop end gondola cars.

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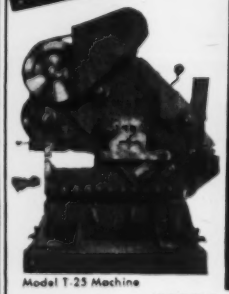
Model T-15; T-25



Model T-25 Machine

— SPECIFICATIONS —

	Model T-15	Model T-25
to Punch	7/8" x 7/16"	1" x 9/16"
to Shear		
Plates	7/16"	1/2"
Flat Bars	3" x 9/16"	3-3/16" x 5/8"
Tees	3-1/8" x 5/16"	4" x 3/8"
Angles	3-1/8" x 5/16"	4" x 3/8"
Round Bars	1-3/16"	1-3/8"
Square Bars	1"	1-1/4"

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Metalworking Briefs . . .

CONSTRUCTION—ENTERPRISE—ORGANIZATIONAL CHANGES

New Firm To Make Presses

A new company, Precision Flexopress Corp., was organized to engineer, manufacture and sell high-speed automatic stamping presses. Officers are: E. W. Forkner, president; Ben Kuresman, executive vice president; T. Embury Jones, secretary-treasurer. Messrs. Forkner and Jones are officers of Precision Welder & Machine Co. while Mr. Kuresman was a partner of the former Ace Tool & Die Works, both companies of Cincinnati. The Flexopress line was manufactured previously by Ace Tool & Die Works. The firm's plant is located at 910 Baymiller St., Cincinnati.

Perfect Circle Buys Foundry

Perfect Circle Corp. will purchase the entire stock of Centrifugal Foundry Co., Muskegon, Mich., on or before Mar. 31. Both companies are engaged in production of centrifugal castings for the manufacture of cylinder liners.

Orinoco Places Contract

A contract was awarded to Morrison-Knudsen de Venezuela, an affiliate of Morrison-Knudsen Co. Inc., Boise, Idaho, by Orinoco Mining Co., United States Steel subsidiary, to construct a 90-mile railroad from Puerto Ordaz on the Orinoco river to the Cerro Bolivar mine. This will be a standard gage Class A railroad.

Central Steel Expanding

Central Steel & Wire Co., Chicago, is building two bays to its plant in that city. These will make a total of nine bays with 520,000 square feet under cranes in this integrated warehouse operation.

Starts $5 Million Project

Hooker Electrochemical Co., Niagara Falls, N. Y., will begin immediately a $5 million expansion program at its Tacoma, Wash., plant to increase production of chlorine and caustic soda.

Shenango To Build Plant

Shenango Agaloy Tube Co., Sharon, Pa., has plans for a $3,640,000 plant for production of precision alloy tubing for the atomic bomb program. The company was granted a loan of $2.5 million by RFC and will add $1,140,000 of its own money. Don V. Sawhill, president, says he has no official confirmation of the RFC loan and plans for the project have not been completed. It is understood the RFC loan stipulates $1.7 million must go for buildings and $800,000 for equipment, etc. While not announced, it is believed the plant will be built in the Sharon area.

Erie Forge Changes Name

Stockholders of Erie Forge Co., Erie, Pa., approved a change in the firm's corporate name to Erie Forge & Steel Corp.

Steel Firm Formed in Texas

Gorbett Bros. Steel Co. Inc., Fort Worth, Tex., was granted a 50-year charter to deal in iron and steel. Incorporators of the company are William Andrew Gorbett, Cleon Gorbett and Edward L. Harvey.

Density of Steel Controlled

Production of newly developed controlled-density steel has started on a small scale at Oakville, Ont. Under direction of the Ontario Research Foundation, the pilot run is aimed to get the process into use in industry as soon as possible. The process is a way of making steel without melting iron ore. It permits output of finished and semi-finished articles of steel directly from the ore itself.

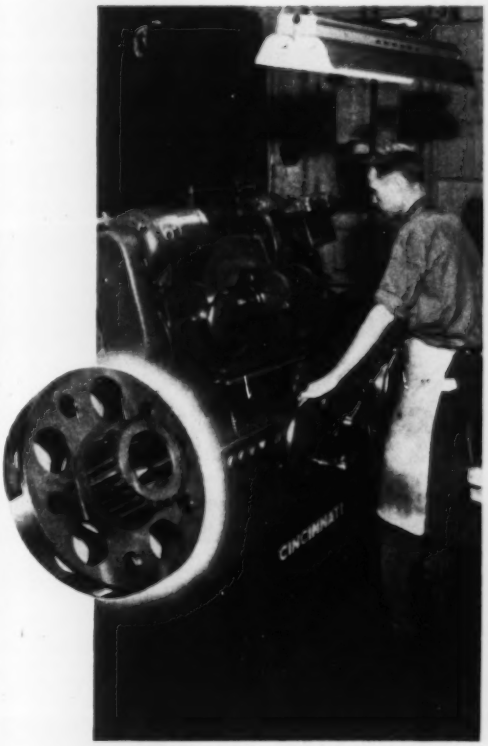
Diffraction Charts Issued

Three charts for X-ray diffraction studies were published by Armour Research Foundation of Illinois Institute of Technology, Chicago. The charts cover the cubic, tetragonal and hexagonal systems and offer a rapid method of indexing X-ray diffraction patterns to determine crystal structure for lattice parameter calculation. The tetragonal and hexagonal system charts are plotted up to sixth order reflections with axial ratios ranging from zero to 2.6. The cubic lattice chart is plotted up to twelfth order reflections.

Metal Trim Maker Expands

To provide for increased production of chromedge metal trim, B & T Metals Co., Columbus, O., plans a $2,175,000 expansion program. The first step in the program calls for new sites in California, followed by additional manufacturing facilities in Georgia and Canada. These additional plant facilities will permit increased capacities for extrusions of all types, larger and improved anodic processing facilities, new auto-

REPUTATION!



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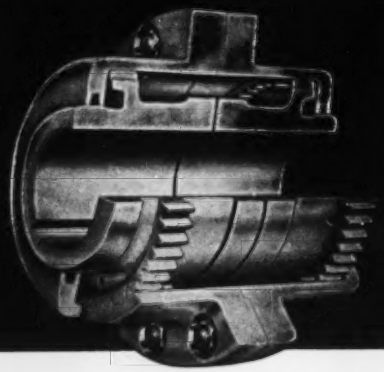

A COPY OF CATALOG GIVING FULL DESCRIPTION AND ENGINEERING DATA SENT UPON REQUEST.

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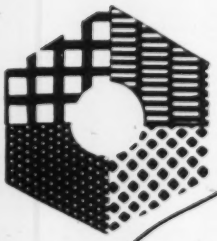

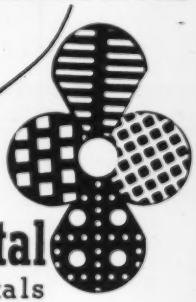

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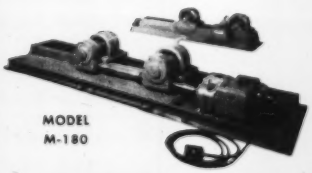

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matic polishing equipment, automatic roll forming equipment, and other improvements.

R. S. Inboden, vice president and general sales manager, says many innovations will be developed. One is a new process for giving aluminum extrusions a finish of "table-silver" brilliance and cleanliness that will not rub off, water-spot, or yield to citric acids and caustic soaps. When the rolling equipment is in operation, a wider range of architectural and industrial moulding shapes can be produced.

American Diamond Tool Co.

A business name was filed in the Erie county, New York, clerk's office for American Diamond Tool Co., 232 Delaware Ave., Buffalo, by Peter L. Battista.

Tulsa Firm Chartered

Tulsa Compressed Steel Corp., Tulsa, Okla., was granted a 20-year charter to conduct business in that state. Incorporators are Harry Borg, Charles A. Whitebook and Joe E. Borg.

Maltby Erects Building

Edward D. Maltby Co. Inc., Los Angeles, manufacturers' engineering and sales representative of bearings, chains, power transmission equipment and oil seals is constructing a building at 52nd street near Gifford avenue, Maywood, Calif.

50th Anniversary Observed

On the occasion of its golden anniversary, Chicago Metal Hose Corp., Maywood, Ill., changed its name to Flexonics Corp. The company produces bellows control devices, pipeline expansion joints, aircraft parts, thermostats and many other products in addition to flexible metal hose and tubing.

Small Motor Plant To Open

Limited production at Westinghouse Electric Corp.'s new Small Motor Division plant in Union City, Ind., will begin Feb. 11. Construction work is complete and about 40 per cent of the machinery is installed. The plant, with an annual payroll of some $1.5 million will manufacture motors under 1 horsepower.

Kennecott Copper Co. Moves

Kennecott Copper Corp. is occupying new offices in the Chrysler Building East, 161 E. 42nd St., New York. The company was one of the first tenants to move into the recently completed building, companion structure of the 77-story Chrysler building. Kennecott's executive offices had been located at 120 Broadway since 1915 when the firm was organized.

STEEL TOOTHPICKS: Looking like toothpicks, reinforcing steel is in place for substructures of powerhouse units at McNary Dam on the Columbia river. The dam, which will be finished about December, 1956, will require 247,500,000 pounds of steel, including 82 miles of relocated railroads. It will have 14 power units generating 980,000 kilowatts. Cost will be about $281.5 million

Allegheny Renames Division

Allegheny Ludlum Steel Corp., Pittsburgh, changed the name of its sintered carbide production and sales units from Carbide Alloys Division to Carmet Division. This division is a large producer of tungsten and other sintered carbide alloys. The division, located at Ferndale, Mich., is undergoing expansion on a large scale. P. E. Floyd is manager of the division while E. C. Lauck is production manager.

Askania Opens Branch Office

Askania Regulator Co., Chicago, established a branch office at 1244 Commercial Trust Bldg., Philadelphia. Robert J. Kroth is in charge of the office as district manager.

David-Ludwig Gets Permit

David-Ludwig Co., Detroit, manufacturer of dust collectors, ovens, spray booths, etc., was granted a 10-year permit to conduct business in Texas. The company has a branch office in Dallas.

New Raybestos Plant Opened

Production of defense materials is under way at the initial unit of Raybestos-Manhattan Inc.'s new midwestern plant at Crawfordsville, Ind. Operator of the plant, Wabash Division, is manufacturing sintered metal friction elements for

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Ductilite
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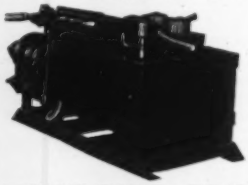

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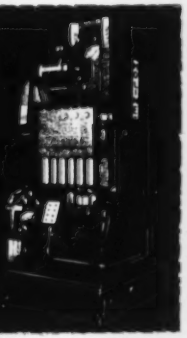

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tanks and other military vehicles and for the aviation, agricultural and automotive industries and other precision parts of powdered metal.

Michaels Buys Meter Business

American-LaFrance-Foamite Corp., Elmira, N. Y., sold its Alfco Twin Automatic Parking Meter Division to Mico Meters Division of Michaels Art Bronze Co. Inc., Covington, Ky.

Will Make Tanks in Houston

Modern Welding Co., Owensboro, Ky., was granted a 10-year permit to conduct welding and fabrication of steel business in Texas. Charles Hagan Jr., Houston, is the Texas agent. The company purchased the plant of L. J. Smith Steel Co. at 715 Sakowitz, Houston, where it will make storage tanks.

Forms Machine, Welding Firm

Best, Kellner & Rogers Machine & Welding Corp. was incorporated in Buffalo. Incorporators are Leonard J. Kellner, Mildred E. Kellner and James A. Rogers.

Los Angeles Branch Opens

Pittsburgh-Des Moines Steel Co., Pittsburgh, opened a new Los Angeles sales office at 6399 Wilshire Blvd. R. C. Ross is in charge.

Rolled Steel Opens Plant

Rolled Steel Products Corp. opened new offices and plant at 6161 Maywood Ave., Huntington Park, Calif. Facilities include slitting, leveling, rolling, shearing, coil straightening, strain relieving, and roll forming of flat rolled and roll formed metal products.

Ordnance Works To Reopen

A contract covering rehabilitation and operation of the Indiana Ordnance Works, Charlestown, Ind., was signed by the Army Ordnance Corps and E. I. du Pont de Nemours & Co., Wilmington, Del.

Lobee Pump Builds Addition

Lobee Pump & Machinery Company, Gasport, N. Y., is erecting a plant addition which will double its production capacity. The firm produces small gear and centrifugal pumps, sprayers and packing house equipment.

Broadens Experimental Work

North American Aviation Inc., Los Angeles, leased 9400 square feet of factory area at 5713-19 Joanna Pl., Culver City, Calif., for production of precision machine parts for experimental work on automatic controls equipment for the company's electro-mechanical department. Design and development of automatic pilot, fire control and navigation units for airplanes and guided missiles will be undertaken at the new plant.

Leeds Opens Atlanta Office

A sales and service office at 3084 Grandview Ave., Atlanta, was opened by Leeds & Northrup Co., Philadelphia, manufacturer of electrical measuring instruments, automatic controls and heat-treating furnaces. William A. Macan III is manager of the office.

GE To Expand Silicone Plant

An expansion program costing more than $5 million to increase capacity of General Electric Co.'s silicone plant in Waterford, N. Y., was announced by Robert L. Gibson, general manager, Chemical Division. Additional manufacturing facilities will be operating by the end of 1952.

Expansion Project Progresses

Steel Company of Canada Ltd.'s current expansion program at Hamilton, Ont., is scheduled to be completed by early 1953. The coke ovens are farthest advanced in the broad $60 million program and coke from the new units may be obtained in the first half of 1952. Steel is arriving for the new open-hearth building.

Ready Tool Appoints Agents

Ready Tool Co., Bridgeport, Conn., manufacturer of antifriction centers, appointed as manufacturer's representatives: Horace S. White, Cincinnati; R. J. Severance, Grand Haven, Mich.; E. S. Weidle, Pittsburgh; and Harry M. Beyers, Fort Wayne, Ind.

Arrow Machines Co. Formed

A business name was filed in the Erie county, New York, clerk's office for Arrow Machines Co., 701 Main St., Buffalo, by Sheldon L. Greenberg, Raymond Bluestein, Norman S. Greenberg and Irwin Lieberman.

Koppers Unifies Research

Koppers Co. Inc., Pittsburgh, will embark on an enlarged and more unified program of research, with a major portion of such work centered at Verona, Pa., where new laboratories are nearing completion. The company purchased a plant site it formerly leased at Verona, rearranged its buildings and added a new building, which will contain administrative offices, research library and conference rooms.

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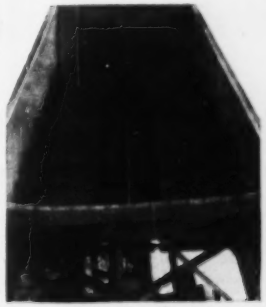
Complete Construction Details Will Be Sent Upon Request



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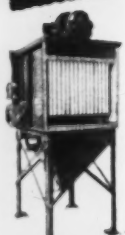

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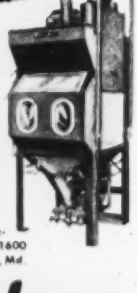

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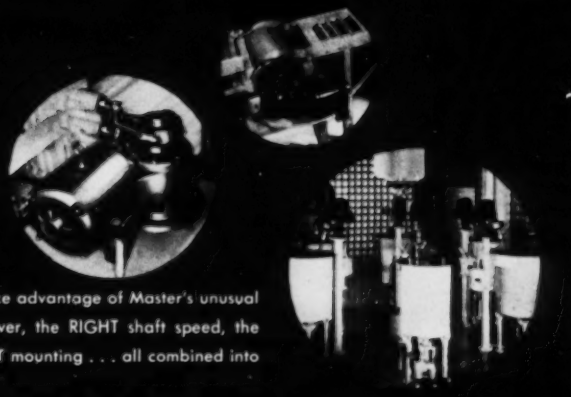


On big jobs or little ones it pays to take advantage of Master's unusual ability to supply the RIGHT horsepower, the RIGHT shaft speed, the RIGHT construction features, the RIGHT mounting . . . all combined into one compact power package.

Don't put up with make-shift assemblies when you too may be enjoying these advantages. Master Motors, available in thousands and thousands of types and ratings (up to 150 HP) give you a selection you can get nowhere else.

Open, enclosed, splash proof, fan-cooled, explosion proof . . . horizontal or vertical . . . for all phases, voltages and frequencies . . . in single speed, multi-speed and variable speed types . . . with or without flanges or other special features . . . with 5 types of gear reduction up to 432 to 1 ratio . . . with electric brakes . . . with mechanical variable speed units . . . and for every type of mounting . . . Master has them all and so can be completely impartial in helping you select the one best motor drive for YOU.

BIG ones

Select the RIGHT power drive from Master's broad line and you can increase the saleability of your motor driven products . . . improve the economy and productivity of your plant equipment.

THE MASTER ELECTRIC COMPANY
DAYTON 1, OHIO

ROLLS STEEL FOR RAZOR BLADES— SHAVES COSTS *with TIMKEN® bearings*

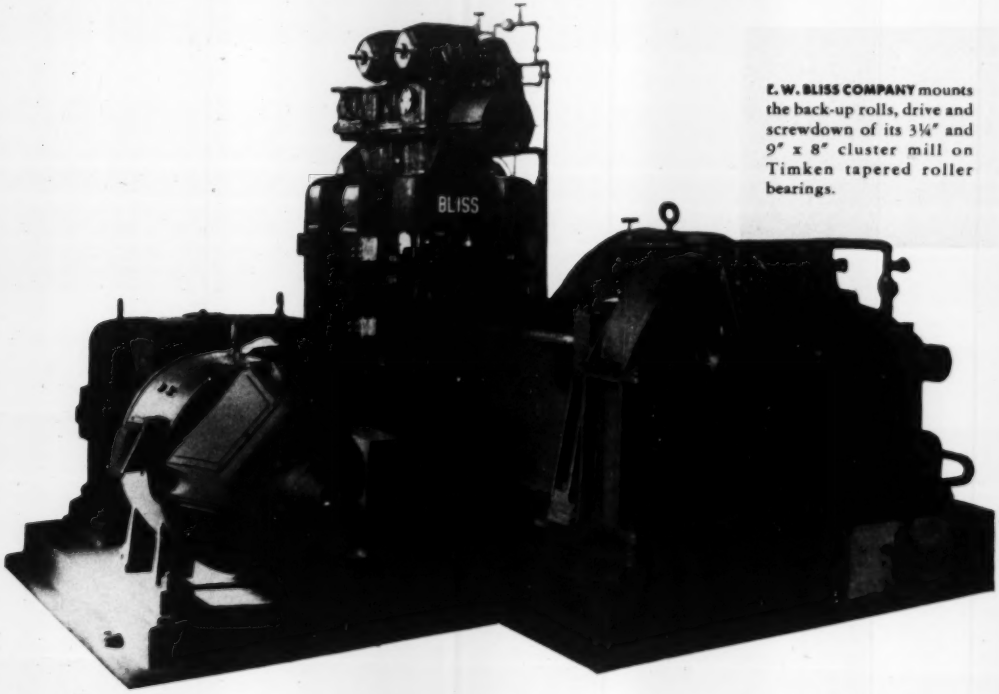
THIS 3¼" and 9" x 8" E. W. Bliss Company cluster mill reduces high carbon alloy and stainless steel. It handles gages of 0.125 to 0.004" at a rate of 100 to 400 feet per minute. To keep down the costs of operating, maintenance and lubrication, Timken® tapered roller bearings are used on the drive, screwdown and back-up rolls.

Timken bearings permit the use of simple, economical grease lubrication, eliminating the use of complicated and costly systems. Rolls can be changed faster, easier. And mills can be stopped and restarted without loss of steel.

Due to their tapered construction, Timken bearings carry radial and thrust loads in any combination, eliminating the need for costly thrust units. True rolling motion and incredibly smooth surface finish of Timken bearings reduces friction. As a result higher rolling speeds are possible.

Whether you buy or build rolling mill equipment, make sure you specify Timken tapered roller bearings. No other bearing can offer you all the advantages of Timken bearings. Look for the trade-mark "Timken" on every bearing. For full information about Timken roll neck bearings, write to the Timken Company's engineering department. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



E. W. BLISS COMPANY mounts the back-up rolls, drive and screwdown of its 3¼" and 9" x 8" cluster mill on Timken tapered roller bearings.

FINISHED TO CLOSER TOLERANCES

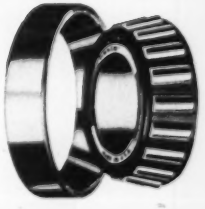
Finishing to incredible smoothness accounts for much of the precise, smooth rolling performance of Timken bearings. This honing operation is typical of the amazingly accurate manufacturing methods at the Timken Company.

The Timken Company is the acknowledged leader in: 1. advanced design; 2. precision manufacturing; 3. rigid quality control; 4. special analysis steels.

TIMKEN

TRADE MARK REG. U.S. PAT. OFF.

TAPERED ROLLER BEARINGS



NOT JUST A BALL ○ NOT JUST A ROLLER ⊂ THE TIMKEN TAPERED ROLLER ⊂ BEARING TAKES RADIAL ○ AND THRUST ⊂ LOADS OR ANY COMBINATION